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(71) Anmelder (für alle Bestimmungsstaaten mit Ausnahme von  
US): EPIGENOMICS AG [DE/DE]; Kastanienallee 24,  
10435 Berlin (DE).

(72) Erfinder; und

(75) Erfinder/Anmelder (nur für US): BERLIN, Kurt  
[DE/DE]; Marienkäferweg 4, 14532 Stahnsdorf (DE).  
PIEPENBROCK, Christian [DE/DE]; Schwartzkopff-  
strasse 7 B, 10115 Berlin (DE). OLEK, Alexander  
[DE/DE]; Schröderstrasse 13, 10115 Berlin (DE).

(74) Anwalt: SCHUBERT, Klemens; Joachimstrasse 9, 10119  
Berlin (DE).

(81) Bestimmungsstaaten (national): AE, AG, AL, AM, AT,  
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(54) Title: DETECTION OF VARIATIONS IN THE DNA METHYLATION PROFILE

(54) Bezeichnung: DETEKTION VON VARIATIONEN DES DNA-METHYLIERUNGSPROFILS

(57) Abstract: The invention relates to an oligonucleotide kit as probe for the detection of relevant variations in the DNA methylation of a target group of genes. The invention further relates to the use of the same for determining the gene variant with regard to DNA methylation, a medical device, using an oligonucleotide kit, a method for determining the methylation state of an individual and a method for the establishment of a model for establishing the probability of onset of a disease state in an individual. Such diseases may be: undesired pharmaceutical side-effects; cancerous diseases; CNS dysfunctions, injuries or diseases; aggressive symptoms or relational disturbances; clinical, psychological and social consequences of brain injury; psychotic disorders and personality disorders; dementia and/or associated syndromes; cardiovascular disease, dysfunction and damage; dysfunction, damage or disease of the gastrointestinal tract; dysfunction, damage or disease of the respiratory system; injury, inflammation, infection, immunity and/or anastasis; dysfunction, damage or disease of the body as an abnormal development process; dysfunction, damage or disease of the skin, muscle, connective tissue or bones; endocrine and metabolic dysfunction, damage or disease; headaches or sexual dysfunction.

(57) Zusammenfassung: Die Erfindung beschreibt einen Satz von Oligonukleotiden als Sonden zur Detektion relevanter Variationen der DNA-Methylierung in einer Zielgruppe von Genen, die Verwendung derselben zum Nachweis von Genvarianten hinsichtlich der DNA-Methylierung, eine medizinische Vorrichtung, welche einen Satz von Oligonukleotiden verwendet, ein Verfahren zur Untersuchung des Methylierungszustandes eines Individuums sowie ein Verfahren zur Erstellung eines Modells zur Bewertung der Eintrittswahrscheinlichkeit einer gesundheitlichen Beeinträchtigung eines Individuums. Derartige Erkrankungen können sein: unerwünschte Arzneimittelwirkungen; Krebserkrankungen; CNS-Fehlfunktionen, Schäden oder Krankheit; aggressive Symptome oder Verhaltensstörungen; klinische, psychologische und soziale Konsequenzen von Gehirnverletzungen; psychotische Störungen und Persönlichkeitsstörungen; Demenz und/oder assoziierte Syndrome; kardiovaskuläre Krankheit, Fehlfunktion und Schädigung; Fehlfunktion, Schädigung oder Krankheit des gastrointestinalen Traktes; Fehlfunktion, Schädigung oder Krankheit des Atmungssystems; Verletzung, Entzündung, Infektion, Immunität und/oder Rekonvaleszenz; Fehlfunktion, Schädigung oder Krankheit des Körpers als Abweichung im Entwicklungsprozess; Fehlfunktion, Schädigung oder Krankheit der Haut, der Muskeln, des Bindegewebes oder der Knochen; endokrine und metabolische Fehlfunktion, Schädigung oder Krankheit; Kopfschmerzen oder sexuelle Fehlfunktion.

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## **Detektion von Variationen des DNA-Methylierungsprofils**

Die Erfindung betrifft einen Satz von Oligonukleotiden als Sonden zur Detektion relevanter Variationen der DNA-Methylierung in einer Zielgruppe von Genen, die Verwendung derselben zum Nachweis von Genvarianten hinsichtlich der DNA-Methylierung, eine medizinische Vorrichtung, welche einen Satz von Oligonukleotiden verwendet, ein Verfahren zur Untersuchung des Methylierungszustandes eines Individuums sowie ein Verfahren zur Erstellung eines Modells zur Bewertung der Eintrittswahrscheinlichkeit einer gesundheitlichen Beeinträchtigung eines Individuums.

Die nach den methodischen Entwicklungen der letzten Jahre in der Molekularbiologie gut studierten Beobachtungsebenen sind die Gene selbst, die Übersetzung dieser Gene in RNA und die daraus entstehenden Proteine. Wann im Laufe der Entwicklung eines Individuums welches Gen angeschaltet wird und wie Aktivieren und Inhibieren bestimmter Gene in bestimmten Zellen und Geweben gesteuert wird, ist mit Ausmaß und Charakter der Methylierung der Gene bzw. des Genoms korrelierbar. Insofern korrelieren pathogene Zustände mit einem veränderten Methylierungsmuster einzelner Gene oder des Genoms.

Die vorliegende Erfindung beschreibt Sätze von Oligomeren und Verfahren zur Detektion relevanter Variationen der DNA-Methylierung in einer Zielgruppe von Genen, die mit nachteiligen Ereignissen für Patienten/Individuen oder aber bestimmten Krankheiten in Zusammenhang stehen.

5-Methylcytosin ist die häufigste kovalent modifizierte Base in der DNA eukaryotischer Zellen. Sie spielt beispielsweise eine Rolle in der Regulation der Transkription, beim genetischen Imprinting und in der Tumorgenese. Die Identifizierung von 5-Methylcytosin als Bestandteil genetischer Information ist daher von erheblichem Interesse. 5-Methylcytosin-Positionen können jedoch nicht durch Sequenzierung identifiziert werden, da 5-Methylcytosin das gleiche Basenpaarungsverhalten auf-

weist wie Cytosin. Darüber hinaus geht bei einer PCR-Amplifikation die epigenetische Information, welche die 5-Methylcytosine tragen, vollständig verloren.

Eine relativ neue und die mittlerweile am häufigsten angewandte Methode zur Untersuchung von DNA auf 5-Methylcytosin beruht auf der spezifischen Reaktion von Bisulfit mit Cytosin, das nach anschließender alkalischer Hydrolyse in Uracil umgewandelt wird, welches in seinem Basenpaarungsverhalten dem Thymidin entspricht. 5-Methylcytosin wird dagegen unter diesen Bedingungen nicht modifiziert. Damit wird die ursprüngliche DNA so umgewandelt, dass Methylcytosin, welches ursprünglich durch sein Hybridisierungsverhalten vom Cytosin nicht unterschieden werden kann, jetzt durch „normale“ molekularbiologische Techniken als einzig verbliebenes Cytosin beispielsweise durch Amplifikation und Hybridisierung oder Sequenzierung nachgewiesen werden kann. Der Stand der Technik, was die Empfindlichkeit betrifft, wird durch ein Verfahren definiert, welches die zu untersuchende DNA in einer Agarose-Matrix einschließt, dadurch die Diffusion und Renaturierung der DNA (Bisulfit reagiert nur an einzelsträngiger DNA) verhindert und alle Fällungs- und Reinigungsschritte durch schnelle Dialyse ersetzt (Olek, A. et al., Nucl. Acids. Res. 1996, 24, 5064-5066). Mit dieser Methode können einzelne Zellen untersucht werden, was das Potential der Methode veranschaulicht. Allerdings werden bisher nur einzelne Regionen bis etwa 3000 Basenpaare Länge untersucht, eine globale Untersuchung von Zellen auf Tausenden von möglichen Methylierungsanalysen ist nicht möglich. Allerdings kann auch dieses Verfahren keine sehr kleinen Fragmente aus geringen Probenmengen zuverlässig analysieren. Diese gehen trotz Diffusionsschutz durch die Matrix verloren.

Eine Übersicht über die weiteren bekannten Möglichkeiten, 5-Methylcytosine nachzuweisen, kann aus dem folgenden Übersichtsartikel entnommen werden: Rein, T., DePamphilis, M. L., Zorbas, H., Nucleic Acids Res. 1998, 26, 2255.

Die Bisulfit-Technik wird bisher bis auf wenige Ausnahmen (z. B. Zechnigk, M. et al., Eur. J. Hum. Gen. 1997, 5, 94-98) nur in der Forschung angewendet. Immer aber werden kurze, spezifische Stücke eines bekannten Gens nach einer Bisulfit-

Behandlung amplifiziert und entweder komplett sequenziert (Olek, A. und Walter, J., Nat. Genet. 1997, 17, 275-276) oder einzelne Cytosin-Positionen durch eine „Primer-Extension-Reaktion“ (Gonzalzo, M. L. und Jones, P. A., Nucl. Acids Res. 1997, 25, 2529-2531, WO-Patent 9500669) oder einen Enzymschnitt (Xiong, Z. und Laird, P. W., Nucl. Acids. Res. 1997, 25, 2532-2534) nachgewiesen. Zudem ist auch der Nachweis durch Hybridisierung beschrieben worden (Olek et al., WO 99 28498).

Weitere Publikationen, die sich mit der Anwendung der Bisulfit-Technik zum Methylierungsnachweis bei einzelnen Genen befassen, sind: Xiong, Z. und Laird, P. W. (1997), Nucl. Acids Res. 25, 2532; Gonzalzo, M. L. und Jones, P. A. (1997), Nucl. Acids Res. 25, 2529; Grigg, S. und Clark, S. (1994), Bioassays 16, 431; Zeschnek, M. et al. (1997), Human Molecular Genetics 6, 387; Teil, R. et al. (1994), Nucl. Acids Res. 22, 695; Martin, V. et al. (1995), Gene 157, 261; WO 97 46705, WO 95 15373 und WO 45560.

Eine Übersicht über den Stand der Technik in der Oligomer Array Herstellung läßt sich aus einer im Januar 1999 erschienenen Sonderausgabe von Nature Genetics (Nature Genetics Supplement, Volume 21, January 1999), der dort zitierten Literatur und dem US-Patent 5994065 über Methoden zur Herstellung von festen Trägern für Zielmoleküle wie Oligonukleotide bei vermindertem nichtspezifischem Hintergrundsignal entnehmen.

Für die Abtastung eines immobilisierten DNA-Arrays sind vielfach fluoreszent markierte Sonden verwendet worden. Die Detektion der Fluoreszenz der hybridisierten Sonden erfolgt beispielsweise über eine Konfokaloptik.

Neuere Verfahren zum Nachweis von Mutationen, die prinzipiell nach der Bisulphit-Behandlung der DNA-Probe mit einigen Modifikationen auch zur Methylierungsanalyse eingesetzt werden können, sind im folgenden aufgeführt:

Als ein Spezialfall der Sequenzierung ist die Einzelbasen-Primer-Erweiterung (Genetic Bit Analysis) erwähnenswert (Head, SR., Rogers, YH., Parikh K., Lan, G., Anderson, S., Goelet, P., Boycejacino MT., Nucleic Acids Research. 25(24): 5065-



5071, 1997; Picoult-Newberg, L., Genome Res. 9(2): 167-174, 1999). Eine kombinierte Amplifikation und Sequenzierung wird in US-Patent 5928906 beschrieben, wo eine basenspezifische Terminierung auf Matrixmolekülen eingesetzt wird. Ein weiteres Verfahren setzt eine Ligase/Polymerasereaktion für die Identifikation von Nukleotiden ein (US-Patent 5952174).

Genomische DNA wird durch Standardmethoden aus DNA von Zell-, Gewebe- oder sonstigen Versuchsproben gewonnen. Diese Standardmethodik findet sich in Referenzen wie Fritsch und Maniatis eds., Molecular Cloning: A Laboratory Manual, 1989.

Gegenwärtig ist es nicht Stand der Technik, grosse Mengen von Proben hinsichtlich einer Vielzahl von für Krankheiten bedeutsamen Methylierungspositionen zu untersuchen.

Aufgabe der vorliegenden Erfindung ist es, Sätze von Oligomersonden, welche an Gene binden, die für nachteilige Ereignisse für Patienten oder bestimmte Krankheitsgruppen von Bedeutung sind, so zusammenzustellen, dass umfassende prognostische Aussagen für den jeweiligen Patienten durch Analyse des jeweiligen Methylierungszustandes dieser Gene möglich werden. Die dabei erfassten Daten werden zu Methylierungsmustern zusammengefasst. Des weiteren soll ein Verfahren geschaffen werden, welches die Analyse von Methylierungspositionen in grossem Umfang unter Verwendung der erwähnten Oligomersonden ermöglicht.

Die Aufgabe wird erfindungsgemäss durch einen Satz von Nukleotidsonden und ein Verfahren zur Untersuchung des Methylierungsprofils eines Patienten oder Individuums. Mit Hilfe des Satzes von Oligonukleotidsonden und/oder des Verfahrens wird das Vorhandensein oder Fehlen der relevanten Methylierungsvarianten aus der Zielgruppe der Gene nachgewiesen. Aus dem Methylierungsmuster ergibt sich durch Abgleich mit Methylierungsmustern in einer Datenbank, welche bereits bestimmten Phänotypen, Prognosen oder Effekten auf den Patienten zugeordnet sind, eine Diagnose.

Diese Aufgabe wird erfindungsgemäß durch einen Satz von Nukleotidsonden gemäss einem oder mehreren der Ansprüche gelöst. Weiterhin kann zur Lösung der Aufgabe ein Verfahren oder eine Vorrichtung genutzt werden, welche einen Satz der erwähnten Nukleotidsonden enthält. Vorteilhafte Ausführungen der Erfindung sind in den jeweiligen Unteransprüchen gekennzeichnet.

Der erfindungsgemässe Satz von Oligonukleotidsonden oder eine Vorrichtung welche diesen enthält dient vorzugsweise zur Prognose und Behandlungsplanung bei Patienten, die an den Konsequenzen von folgenden nachteiligen Ereignissen leiden oder bei welchen das Risiko des Eintritts von folgenden nachteiligen Ereignissen besteht:

- unerwünschte Arzneimittelwirkungen
- Krebserkrankungen
- CNS-Fehlfunktionen, Schäden oder Krankheit
- aggressive Symptome oder Verhaltensstörungen
- klinische, psychologische und soziale Konsequenzen von Gehirnverletzungen
- psychotische Störungen und Persönlichkeitsstörungen
- Demenz und/oder assoziierte Syndrome
- kardiovaskuläre Krankheit, Fehlfunktion und Schädigung
- Fehlfunktion, Schädigung oder Krankheit des gastrointestinalen Traktes
- Fehlfunktion, Schädigung oder Krankheit des Atmungssystems
- Verletzung, Entzündung, Infektion, Immunität und/oder Rekonvaleszenz
- Fehlfunktion, Schädigung oder Krankheit des Körpers als Abweichung im Entwicklungsprozess
- Fehlfunktion, Schädigung oder Krankheit der Haut, der Muskeln, des Bindegewebes oder der Knochen
- endokrine und metabolische Fehlfunktion, Schädigung oder Krankheit
- Kopfschmerzen oder
- sexuelle Fehlfunktion.

Diese Aufzählung ist nicht abschliessend und dem Fachmann ist klar, dass mittels der erfinderischen Idee jede Erkrankung oder Fehlfunktion eines Organismus oder Individuums anwendbar ist.

Die Oligomersonden umfassen Sequenzen, welche an die Gene binden, die mit diesen nachteiligen Ereignissen in Zusammenhang stehen. Die Oligomersonden binden an die Sequenzen, wie sie nach einer Behandlung der DNA-Probe vorliegen, welche nicht methyliertes Cytosin in Uracil umwandelt. Die Gene sind in den Ansprüchen detailliert aufgeführt. Erfindungsgemäss gehören diese Gene zu mindestens einer der folgenden Proteinfunktionen: Enzyme, Transport, Lagerung, Struktur, Immunität, nervale Transmission, Wachstum und Differenzierung.

In folgenden wird das Verfahren beschrieben, dass für eine Bewertung, ob bei einem Patienten, einem Individuum oder einer Bevölkerungsgruppe nachteilige Ereignisse eintreten werden oder wahrscheinlich eintreten werden, den Satz der Oligomersonden verwendet. Im ersten Schritt entnimmt man eine DNA-Probe von Patienten oder Individuen, bei welchen ein nachteiliges Ereignis diagnostiziert wurde bzw. in der Kontrollgruppe nicht diagnostiziert wurde. Die mittels der Lösung eines Bisulfits, Hydrogensulfits oder Disulfits vorbehandelten DNA-Proben werden im zweiten Schritt des Verfahrens zum Nachweis von relevanten Genvarianten hinsichtlich der DNA-Methylierung mit einem Satz von Oligonukleotiden als Sonden hybridisiert, die innerhalb der jeweiligen Zielgruppe von Genen an nach der Bisulfitbehandlung vorliegende Sequenzen binden, in denen eine Cytosin Methylierung potentiell vorliegen kann. Es ergibt sich ein Hybridisierungsmuster, welches im dritten Schritt des Verfahrens in ein Methylierungsmuster der Gene der jeweiligen DNA-Probe übersetzt wird.

Gleichermassen würde man vorgehen, wollte man ein Modell zur Bewertung von Risiken für Patienten oder Patientengruppen erarbeiten.

Erfindungsgemäss gehören diese Gene zu mindestens einer der folgenden Proteinfunktionen: Enzyme, Transport, Lagerung, Struktur, Immunität, nervale Transmissi-

on, Wachstum und Differenzierung. Die besagten Gene stehen in Zusammenhang mit einer Vielzahl von nachteiligen Ereignissen, dazu gehören:

- unerwünschte Arzneimittelwirkungen
- Krebserkrankungen
- ZNS-Fehlfunktionen, Schäden oder Krankheit
- aggressive Symptome oder Verhaltensstörungen
- klinische, psychologische und soziale Konsequenzen von Gehirnverletzungen
- psychotische Störungen und Persönlichkeitsstörungen
- Demenz und/oder assoziierte Syndrome
- kardiovaskuläre Krankheit, Fehlfunktion und Schädigung
- Fehlfunktion, Schädigung oder Krankheit des gastrointestinalen Traktes
- Fehlfunktion, Schädigung oder Krankheit des Atmungssystems
- Verletzung, Entzündung, Infektion, Immunität und/oder Rekonvaleszenz
- Fehlfunktion, Schädigung oder Krankheit des Körpers als Abweichung im Entwicklungsprozess
- Fehlfunktion, Schädigung oder Krankheit der Haut, der Muskeln, des Bindegewebes oder der Knochen
- endokrine und metabolische Fehlfunktion, Schädigung oder Krankheit
- Kopfschmerzen oder
- sexuelle Fehlfunktion.

Die Oligonukleotidsonden sind dadurch gekennzeichnet, dass sie zu DNA-Sequenzen der Zielgruppe von Genen komplementär sind oder ihnen entsprechen, wie sie nach einer chemischen Behandlung vorliegt, welche nicht methylierte Cytosine in Uracil umwandelt, vorzugsweise eine Behandlung mit Natriumbisulfit.

Im letzten Schritt des Verfahrens wird die Häufigkeit der Allele mit unterschiedlichem Methylierungsmuster berechnet und die Häufigkeiten der Allele bei Patienten und Individuen mit nachteiligen Ereignissen und der entsprechenden Kontrollgruppe verglichen.

Bevorzugt wird mindestens einer der Schritte des Verfahrens mit einem Computer ausgeführt.

In einer bevorzugten Variante des Verfahrens wird das Methylierungsmuster eines Individuums mit den bereits in der Datenbank vorhandenen Einträgen oder einem daraus abgeleiteten Modell verglichen, um daraus das Risiko des Eintritts von nachteiligen Ereignissen zu bewerten.

Der Satz von Oligonukleotiden besteht bevorzugt aus Oligonukleotiden, die an bekannten Orten in einem rechtwinkligen oder hexagonalen Raster auf einem Träger angeordnet sind. Dieser Träger besteht aus Silizium, Glas, Polystrol, Aluminium, Stahl, Eisen, Kupfer, Nickel, Silber oder Gold.

Zum Nachweis der Genvarianten hinsichtlich Methylierung und unterschiedlicher Genexpression wird bevorzugt eine medizintechnische Vorrichtung verwendet, welche den besagten Satz von Oligonukleotiden enthält.

In einer bevorzugten Variante des Verfahrens verwendet man einen besagten Oligonukleotidsatz oder eine Vorrichtung, die selbigen enthält, zur Vorhersage wahrscheinlicher therapeutischer Folgen oder nachteiliger Ereignisse infolge einer therapeutischen Intervention oder infolge der Einnahme spezifischer Medikamente.

In einer bevorzugten Variante des Verfahrens verwendet man einen besagten Oligonukleotidsatz oder eine Vorrichtung zur Vorhersage wahrscheinlicher Symptome bei Eintritt der oben aufgeführten nachteiligen Ereignisse und der Wahrscheinlichkeit des Auftretens von Folgekrankheiten bzw. weiteren Symptomen.

In einer weiteren bevorzugten Variante des Verfahrens verwendet man einen besagten Oligonukleotidsatz oder eine Vorrichtung für folgende Ziele:

- Entwicklung neuer Strategien bei der therapeutischen Intervention und in klinischen Studien

- Modellierung und Bewertung der Auswirkung von Krankheiten und Gesundheitsvorsagemaßnahmen auf Individuen, Bevölkerungsgruppen, Patientengruppen und Populationen
- Optimierung der therapeutischen Intervention

Weiterer Gegenstand der vorliegenden Erfindung ist ein Kit zur Durchführung eines Assays, mit dem man das Risiko eines Patienten oder Individuums einschätzen kann, nachteilige Ereignisse zu erfahren. Dieses Kit umfasst Testmöglichkeiten auf Anwesenheit oder Abwesenheit von relevanten Variationen hinsichtlich DNA-Methylierung der oben aufgeführten Gene in einer Probe von genomischer DNA. Reagenzien für den Gebrauch im Detektionsverfahren sind ebenso enthalten, wie ein Script, das die Wahrscheinlichkeit eines Patienten oder Individuums beschreibt, unerwünschte Ereignisse zu erfahren.

Die Aufgabe der Erfindung wird also gelöst durch einen Satz von Oligonukleotiden als Sonden zur Detektion relevanter Variationen der DNA Methylierung in einer Zielgruppe von Genen, dadurch gekennzeichnet, dass die Oligonukleotide zur DNA-Sequenz der Zielgruppe von Genen komplementär sind oder ihnen entsprechen, wie sie nach einer chemischen Behandlung, welche nicht methylierte Cytosine in Uracil umwandelt, vorliegen, wobei die Zielgruppe im wesentlichen Gene umfasst, welche mit einer gesundheitlichen Beeinträchtigung eines Individuums in Zusammenhang stehen.

Es ist erfindungsgemäß bevorzugt, dass der Satz von Oligonukleotiden dadurch gekennzeichnet ist, dass die gesundheitlichen Beeinträchtigungen unerwünschte Arzneimittelwirkungen; Krebs; CNS-Fehlfunktionen, Schädigung oder Krankheit; aggressive Symptome oder Verhaltensstörungen; klinische, psychologische und soziale Konsequenzen einer Gehirnverletzung; Demenz und/oder assoziierte Syndrome; psychotische Störungen und Persönlichkeitsstörungen; kardiovaskuläre Krankheit, Fehlfunktion oder Schädigung; Fehlfunktion, Schädigung oder Erkrankung des Gastroin-

testinaltrakts; Schädigung oder Erkrankung des Atmungssystems; Verletzung, Entzündung, Infektion, Immunität und/oder Rekonvaleszenz; Fehlfunktion, Schädigung oder Erkrankung des Körpers als Folge einer Abweichung im Entwicklungsprozess, Fehlfunktion, Schädigung oder Krankheit der Haut, der Muskeln, des Bindegewebes oder der Knochen; endokrine und metabolische Fehlfunktion; Kopfschmerzen; sexuellen Fehlfunktionen sind.

Weiterhin bevorzugt ist es, dass der Satz von Oligonukleotiden dadurch gekennzeichnet ist, dass die mit unerwünschten Arzneimittelwirkungen in Zusammenhang stehenden Gene ausgewählt sind aus Tabelle 1, die mit Krebs in Zusammenhang stehenden Gene ausgewählt sind aus Tabelle 2, die mit Symptomen und Konsequenzen von CNS-Fehlfunktion in Zusammenhang stehenden Gene ausgewählt sind aus Tabelle 3, die mit aggressiven Symptomen oder Verhaltensstörungen in Zusammenhang stehenden Gene ausgewählt sind aus Tabelle 4, die mit den Folgen von klinischen, psychologischen und sozialen Konsequenzen einer Gehirnverletzung in Zusammenhang stehenden Gene ausgewählt sind aus Tabelle 5, die mit mit Demenz und/oder assoziierten Syndromen in Zusammenhang stehenden Gene ausgewählt sind aus Tabelle 6, die mit psychotischen Störungen und Persönlichkeitsstörungen in Zusammenhang stehenden Gene ausgewählt sind aus Tabelle 7, die mit kardiovaskulärer Krankheit, Fehlfunktion oder Schädigung in Zusammenhang stehenden Gene ausgewählt sind aus Tabelle 8, die mit Fehlfunktion, Schädigung oder Erkrankung des Gastrointestinaltrakts in Zusammenhang stehenden Gene ausgewählt sind aus Tabelle 9, die mit Fehlfunktion, Schädigung oder Erkrankung des Atmungssystems in Zusammenhang stehenden Gene ausgewählt sind aus Tabelle 10, die mit Verletzung, Entzündung, Infektion, Immunität und/oder Rekonvaleszenz in Zusammenhang stehenden Gene ausgewählt sind aus Tabelle 11, die mit Fehlfunktion, Schädigung oder Erkrankung des Körpers als Folge einer Abweichung im Entwicklungsprozess in Zusammenhang stehenden Gene ausgewählt sind aus Tabelle 12, die mit einer Fehlfunktion, Schädigung oder Erkrankung der Haut, der Muskeln, des Bindegewebes oder der Knochen in Zusammenhang stehenden Gene ausgewählt sind aus Tabelle 13, die mit endokriner und metabolischer Fehlfunktion, Schädigung oder Erkrankung in Zusammenhang stehenden Gene ausgewählt sind aus Tabelle 14, die

mit Kopfschmerzen in Zusammenhang stehenden Gene ausgewählt sind aus Tabelle 15 und die mit sexuellen Fehlfunktionen in Zusammenhang stehenden Gene ausgewählt sind aus Tabelle 16.

Erfindungsgemäß bevorzugt ist ein Satz von Oligonukleotiden, in dem Oligonukleotide mit bis zu 5% der aufgeführten Gene nicht enthalten sind.

Insbesondere bevorzugt ist ein Satz von Oligonukleotiden, in dem Oligonukleotide mit mindestens 95% der aufgeführten Gene zusammen mit einer begrenzten Anzahl zusätzlicher nicht aufgeführter Oligonukleotide enthalten sind.

Vorteilhaft ist ein Satz von Oligonukleotiden, in dem bis zu 5 % der entsprechenden Oligonukleotide der aufgeführten Gene durch einen kompletten Satz von 25% anderer nicht aufgeführter Oligonukleotide ersetzt sind.

Weiterhin vorteilhaft ist ein Satz von Oligonukleotiden für eine Zielgruppe von Genen, in welcher die chemisch vorbehandelte DNA Sequenz der nachzuweisenden Gene mindestens zu 95% mit der entsprechend vorbehandelten DNA Sequenz der Gene aus obiger Liste übereinstimmt.

Besonders vorteilhaft ist ein Satz von Oligonukleotiden, wobei die chemische Vorbehandlung mittels der Lösung eines Bisulfits, Hydrogensulfits oder Disulfits durchgeführt wird.

Insbesondere vorteilhaft ist ein Satz von Oligonukleotiden bestehend aus einer Untergruppe der Zielgruppe von Genen.

Erfindungsgemäß bevorzugt ist Satz von Oligonukleotiden, in welchem die Oligonukleotide an bekannten Orten in einem rechtwinkligen oder hexagonalen Raster auf einem Träger angeordnet sind.

Weiterhin bevorzugt ist ein Satz von Oligonukleotiden, wobei die Oligonukleotide auf einem Träger angeordnet sind, welcher aus Silizium, Glas, Polystyrol, Aluminium, Stahl, Eisen, Kupfer, Nickel, Silber oder Gold besteht.



Besonders bevorzugt ist ein Satz von, wobei die Oligonukleotidsonden über ihre Masse, Elektrostatik, Ladung oder Fluoreszenz oder mit Radionukleotiden markiert sind.

Insbesondere bevorzugt ist die Verwendung eines Satzes von Oligonukleotiden, in einer biologischen Untersuchung zum Nachweis besagter Genvarianten hinsichtlich der DNA-Methylierung.

Vorteilhaft ist eine medizintechnische Vorrichtung, welche einen erfindungsgemäßen Oligonukleotidsatz enthält, zur Verwendung in einer Untersuchung zum Nachweis besagter Genvarianten, insbesondere als Indikation für ein höheres Risiko eines Patienten oder Individuums, Symptome und Folgeerscheinungen von Krebs zu entwickeln oder als Indikation für ein höheres Risiko der Entwicklung von CNS-Fehlfunktion, Beschädigung oder Krankheit oder für den Patienten oder das Individuum, Symptome und Konsequenzen von CNS-Fehlfunktion, Beschädigung oder Krankheit zu erfahren.

Insbesondere vorteilhaft ist eine medizintechnische Vorrichtung, welche einen erfindungsgemäßen Oligonukleotidsatz enthält, zur Verwendung in einer Untersuchung zum Nachweis unterschiedlicher Genexpression und/oder zur Prognose und zum Management von Patienten, die an dem Risiko leiden, Symptome und Folgeerscheinungen von Krebs zu entwickeln und/oder zur Verwendung in einer Untersuchung, ob ein Patient oder Individuum möglicherweise CNS-Fehlfunktion, Beschädigung oder Krankheit entwickelt oder für den Patienten oder das Individuum die Wahrscheinlichkeit besteht, Symptome und Konsequenzen von CNS-Fehlfunktion, Beschädigung oder Krankheit zu erfahren.

Erfindungsgemäß bevorzugt ist ein Verfahren zur Untersuchung des DNA Methylierungsprofils eines Patienten oder Individuums, welche das Vorhandensein oder Fehlen der relevanten Methylierungsvarianten aus der Zielgruppe von Genen nachweist, indem eine chemisch vorbehandelte Nukeinsäureprobe von besagtem Patienten oder Individuum an einen erfindungsgemäßen Oligonukleotidsatz hybridisiert wird und das Hybridisierungsmuster mit den Variationen in Beziehung gesetzt wird.

Besonders bevorzugt ist Verwendung eines erfindungsgemäßen Satzes von Oligonukleotiden oder einer erfindungsgemäßen Vorrichtung zur Prognose und/oder Behandlungsplanung bei Patienten, die an einer gesundheitlichen Beeinträchtigung lei-

den oder bei denen das Risiko des Eintritts einer gesundheitlichen Beeinträchtigung besteht.

Insbesondere vorteilhaft ist die erfindungsgemäße Verwendung, zur Prognose und/oder Behandlungsplanung bei Patienten, die an den Folgen von unerwünschten Arzneimittelwirkungen leiden oder bei welchen das Risiko des Eintritts von unerwünschten Arzneimittelwirkungen besteht, die an dem Risiko zur Entwicklung von Symptomen und Folgeerscheinungen von Krebs leiden, die von einem erhöhten Risiko von CNS-Fehlfunktion, Beschädigung oder Krankheit betroffen sind, die an den Folgen von aggressiven Symptomen oder Verhaltensstörungen leiden oder bei welchen das Risiko des Eintritts von aggressiven Symptomen oder Verhaltensstörungen besteht, die an den Folgen von klinischen, psychologischen und sozialen Konsequenzen einer Gehirnverletzung leiden oder bei welchen das Risiko des Eintritts von Folgen von klinischen, psychologischen und sozialen Konsequenzen einer Gehirnverletzung besteht, die an Demenz und/oder assoziierten Syndromen leiden oder bei welchen das Risiko des Eintritts von Demenz und/oder assoziierten Syndromen besteht, die an Symptomen und Folgen von psychotischen Störungen und Persönlichkeitsstörungen leiden oder bei welchen das Risiko des Eintritts von psychotischen Störungen und Persönlichkeitsstörungen besteht, die an den Symptomen oder Konsequenzen von kardiovaskulärer Krankheit, Fehlfunktion oder Schädigung leiden oder bei welchen das Risiko des Eintritts von Symptomen oder Konsequenzen von kardiovaskulärer Krankheit, Fehlfunktion oder Schädigung besteht, die an den Symptomen und Konsequenzen von Fehlfunktion, Schädigung oder Erkrankung des Gastrointestinaltrakts leiden oder bei welchen das Risiko des Eintritts von Symptomen und Konsequenzen von Fehlfunktion, Schädigung oder Erkrankung des Gastrointestinaltrakts besteht, die klinische oder soziale Konsequenzen erfahren, die sich aus Fehlfunktion, Schädigung oder Erkrankung des Atmungssystems ergeben oder bei welchen das Risiko von klinischen oder sozialen Konsequenzen besteht, die sich aus Fehlfunktion, Schädigung oder Erkrankung des Atmungssystems, die an Symptomen und Folgen von Verletzung, Entzündung, Infektion, Immunität und/oder Rekonvaleszenz leiden oder bei welchen das Risiko des Eintritts von Symptomen und Folgen von Verletzung, Entzündung, Infektion, Immunität und/oder Rekonvaleszenz besteht, die an den Folgen von Fehlfunktion, Schädigung oder Krankheit des Körpers als Folge einer Abweichung im Entwicklungsprozess leiden oder bei welchen das Risiko des Eintritts von Fehlfunktion, Schädigung oder Krankheit des Körpers als Folge einer Abweichung im Entwicklungsprozess besteht, die an den Folgen von einer Fehlfunk-

tion, Schädigung oder Krankheit der Haut, der Muskeln, des Bindegewebes oder der Knochen leiden oder bei welchen das Risiko des Eintritts von einer Fehlfunktion, Schädigung oder Krankheit der Haut, der Muskeln, des Bindegewebes oder der Knochen besteht, die an den Folgen von endokriner und metabolischer Fehlfunktion, Schädigung oder Krankheit leiden oder bei welchen das Risiko des Eintritts von endokriner und metabolischer Fehlfunktion, Schädigung oder Krankheit besteht, die an den Folgen von Kopfschmerzen leiden oder bei welchen das Risiko des Eintritts von Kopfschmerzen besteht und/oder die an den Folgen von sexuellen Fehlfunktionen leiden oder bei welchen das Risiko des Eintritts von sexuellen Fehlfunktionen besteht.

Bevorzugt ist die Verwendung eines erfindungsgemäßen Satzes von Oligonukleotiden oder einer erfindungsgemäßen Vorrichtung zur Vorhersage wahrscheinlicher therapeutischer Folgen von unerwünschten Arzneimittelwirkungen infolge einer therapeutischen Intervention und/oder zur Vorhersage wahrscheinlicher therapeutischer Folgen und nachteiliger Ergebnisse infolge einer therapeutischen Intervention.

Weiterhin bevorzugt ist die Verwendung eines erfindungsgemäßen Satzes von Oligonukleotiden oder einer erfindungsgemäßen Vorrichtung zur Vorhersage wahrscheinlicher therapeutischer Risiken oder von unerwünschten Arzneimittelwirkungen infolge der Einnahme spezifischer Medikamente.

Insbesondere bevorzugt Verwendung eines erfindungsgemäßen Satzes von Oligonukleotiden oder einer erfindungsgemäßen Vorrichtung zur Vorhersage wahrscheinlicher Symptome bei Eintritt von unerwünschten Arzneimittelwirkungen und der Wahrscheinlichkeit des Auftretens von Folgekrankheiten bzw. weiteren Symptomen und/oder zur Vorhersage wahrscheinlicher Muster von Krankheitssymptomen und der Wahrscheinlichkeit des Auftretens von Folgekrankheiten bzw. weiteren Symptomen.

Vorteilhaft ist die Verwendung eines erfindungsgemäßen Satzes von Oligonukleotiden oder einer erfindungsgemäßen Vorrichtung für die Entwicklung neuer Strategien bei der therapeutischen Intervention und in klinischen Studien und/oder für die Prognose oder das Management von Patienten, die an sich entwickelnden aggressiven Symptomen oder Verhaltensstörungen leiden oder für besagte Störungen zur Risikogruppe gehören und/oder zur Modellierung und Bewertung der Auswirkung von

Krankheiten und Gesundheitsvorsorgemaßnahmen auf Individuen, Bevölkerungsgruppen, Patientengruppen und Populationen und/oder zur Generierung eines Modells, um das Risiko für Individuen, Bevölkerungsgruppen, Patientengruppen und Populationen einzuschätzen, Symptome und Folgeerscheinungen von Krebs zu entwickeln und/oder zur Generierung eines Modells zur Bewertung des Risikos der Entwicklung von Symptomen und Folgeerscheinungen von CNS-Fehlfunktion, Beschädigung oder Krankheit und/oder zur Optimierung der therapeutischen Intervention.

Insbesondere vorteilhaft ist ein Verfahren zur Erstellung eines Modells zur Bewertung, ob bei einem Patienten, einem Individuum oder einer Bevölkerungsgruppe eine gesundheitliche Beeinträchtigungen eintreten werden oder wahrscheinlich eintreten werden, welches folgende Schritte umfasst:

- a) man entnimmt eine DNA Probe von Patienten oder Individuen, bei welchen eine gesundheitliche Beeinträchtigung diagnostiziert wurde;
- b) man entnimmt eine DNA Probe aus einer Kontrollgruppe von Individuen, bei welchen diagnostisch das Vorliegen dieser gesundheitlichen Beeinträchtigung ausgeschlossen wurde;
- c) man analysiert die in a) und b) erhaltenen Proben zur Bestimmung der DNA Methylierungsvariation innerhalb der erfindungsgemäßen Zielgruppe von Genen gemäß;
- d) man berechnet die Häufigkeit der Allele mit unterschiedlichem Methylierungsmuster in den Proben aus a) und b);
- e) man vergleicht die Häufigkeiten der Allele in den Proben aus a) und b),
- f) man führt eine statistische Analyse der unter e) erhalten Ergebnisse durch um ein Modell zur Bewertung des Risikos des Eintritts gesundheitlicher Beeinträchtigungen zu erhalten.

Bevorzugt ist ein erfindungsgemäßes Verfahren, wobei die gesundheitliche Beeinträchtigung ausgewählt ist aus: unerwünschten Arzneimittelwirkungen; Krebs; Symptomen und Folgeerscheinungen von CNS-Fehlfunktion, Beschädigung oder Krankheit; sich entwickelnde aggressive Symptome oder Verhaltensstörungen; Folgen von klinischen, psychologischen und sozialen Konsequenzen einer Gehirnverletzung; Demenz und/oder assoziierte Syndrome; psychotische Störungen und Persönlichkeitsstörungen; Symptome oder Konsequenzen von kardiovaskulärer Krankheit, Fehlfunktion oder Schädigung; Symptome und Konsequenzen von Fehlfunktion, Schädigung oder Erkrankung des Gastrointestinaltrakts; Fehlfunktion, Schädigung oder Erkrankung des Atmungssystems; Symptome und Folgen von Verletzung, Ent-

zündung, Infektion, Immunität und/oder Rekonvaleszenz; Fehlfunktion, Schädigung oder Krankheit des Körpers als Folge einer Abweichung im Entwicklungsprozess; Fehlfunktion, Schädigung oder Krankheit der Haut, der Muskeln, des Bindegewebes oder der Knochen; endokrine und metabolische Fehlfunktion, Schädigung oder Krankheit; Kopfschmerzen; sexuelle Fehlfunktionen.

Vorteilhaft ist ein Verfahren zur Bewertung, ob ein bestimmtes Individuum das Risiko des Eintritts gesundheitlicher Beeinträchtigungen trägt, wobei man das Methylierungsprofil mit dem erfindungsgemäß erstellten Modell vergleicht.

Besonders vorteilhaft ist ein Verfahren gemäß, wobei mindestens einer der Schritte von einem Computer ausgeführt wird.

Weiterhin vorteilhaft ist ein gestalteter Assay für die Nutzung der Einschätzung des Risikos eines Patienten oder Individuums nachteilige Ereignisse und/oder gesundheitliche Beeinträchtigungen zu erfahren, besagtes Kit beinhaltend:

- a) Testmöglichkeiten auf Anwesenheit oder Abwesenheit von verschlüsselten relevanten polymorphen DNA-Variationen der erfindungsgemäßen Kerngruppe von Genen, in einer Probe von genomischer DNA.
- b) Reagenzien für den Gebrauch im Detektionsverfahren.
- c) Script, das die Wahrscheinlichkeit eines Patienten oder Individuums beschreibt, unerwünschte Ereignisse und/oder gesundheitliche Beeinträchtigungen zu erfahren.

Insbesondere vorteilhaft ist ein gestalteter Assay für die Nutzung der Einschätzung des Risikos eines Patienten oder Individuums nachteilige Ereignisse und/oder gesundheitliche Beeinträchtigungen, dadurch gekennzeichnet, dass das nachteilige Ereignis oder die gesundheitliche Beeinträchtigung ausgewählt ist aus: unerwünschten Arzneimittelwirkungen; Krebs; Symptomen und Fehlfunktionen von CNS-Fehlfunktion, Beschädigung oder Krankheit; sich entwickelnde aggressive Symptome oder Verhaltensstörungen; Folgen von klinischen, psychologischen und sozialen Konsequenzen einer Gehirnverletzung; Demenz und/oder assoziierte Syndrome; psychotische Störungen und Persönlichkeitsstörungen; Symptome oder Konsequenzen von kardiovaskulärer Krankheit, Fehlfunktion oder Schädigung; Symptome und Konsequenzen von Fehlfunktion, Schädigung oder Erkrankung des Gastrointestinaltrakts; Fehlfunktion, Schädigung oder Erkrankung des Atmungssystems; Symptome und Folgen von Verletzung, Entzündung, Infektion, Immunität und/oder Re-

konvaleszenz; Fehlfunktion, Schädigung oder Krankheit des Körpers als Folge einer Abweichung im Entwicklungsprozess; Fehlfunktion, Schädigung oder Krankheit der Haut, der Muskeln, des Bindegewebes oder der Knochen; endokrine und metabolische Fehlfunktion, Schädigung oder Krankheit; Kopfschmerzen; sexuelle Fehlfunktionen.

**Tabelle 1**  
**unerwünschte Arzneimittelwirkung**

<b>Liste der Gene</b>	<b>HUGO Gensymbol</b>	<b>Protein- funktion</b>
5-Adenosyl homocysteine hydrolase		1
Acetoacetyl 1-CoA-thiolase	ACAT1	1
Acetoacetyl 2-CoA-thiolase	ACAT2	1
Acetyl CoA acyltransferase	ACAA	1
Acetylcholine receptor, nicotinic, alpha A1	CHRNA1	5
Acetylcholine receptor, nicotinic, alpha A2	CHRNA2	5
Acetylcholine receptor, nicotinic, alpha A3	CHRNA3	5
Acetylcholine receptor, nicotinic, alpha A4	CHRNA4	5
Acetylcholine receptor, nicotinic, alpha A5	CHRNA5	5
Acetylcholine receptor, nicotinic, alpha A6	CHRNA6	5
Acetylcholine receptor, nicotinic, alpha A7	CHRNA7	5
Acetylcholine receptor, nicotinic, beta 1	CHRNA1	5
Acetylcholine receptor, nicotinic, beta 2	CHRNA2	5
Acetylcholine receptor, nicotinic, beta 3	CHRNA3	5
Acetylcholine receptor, nicotinic, beta 4	CHRNA4	5
Acetylcholine receptor, nicotinic, epsilon	CHRNA5	5
Acetylcholine receptor, nicotinic, gamma	CHRNA6	5
Acetylcholinesterase	ACHE	1
Actin, alpha, cardiac	ACTC	3
Actin, alpha, skeletal	ACTA1	3
Actin, alpha, smooth, aortic	ACTA2	3
Actin, beta	ACTB	3
Actin, gamma 2	ACTG2	3
Acyl CoA dehydrogenase, short chain	ACADS	1
Adenine phosphoribosyltransferase	APRT	2
Adenosine deaminase	ADA	1
Adenosine monophosphate deaminase	AMPD	1
Adenosine receptor A1	ADORA1	5
Adenosine receptor A2A	ADORA2A	5
Adenosine receptor A2B	ADORA2B	5
Adenosine receptor A3	ADORA3	5
Adenylate cyclase 1	ADCY1	1
Adenylate cyclase 2	ADCY2	1
Adenylate cyclase 3	ADCY3	1
Adenylate cyclase 4	ADCY4	1
Adenylate cyclase 5	ADCY5	1
Adenylate cyclase 6	ADCY6	1
Adenylate cyclase 7	ADCY7	1
Adenylate cyclase 8	ADCY8	1
Adenylate cyclase 9	ADCY9	1
Adenylate kinase	AK1	1

Adenylate transferase		1
Adenylosuccinate lyase	ADSL	1
ADP-ribosyltransferase	ADPRT	1
Adrenergic receptor, alpha1	ADRA1	5
Adrenergic receptor, alpha2	ADRA2	5
Adrenergic receptor, beta1	ADRB1	5
Adrenergic receptor, beta2	ADRB2	5
Adrenergic receptor, beta3	ADRB3	5
Adrenocorticotrophic hormone (ACTH) receptor	ACTHR	6
Adrenoleukodystrophy gene	ALD	1
Albumin, ALB	ALB	2
Alkaptonuria gene	AKU	6
Alpha I acid glycoprotein	AAG, AGP	2
Alpha-1-antitrypsin	PI	1
Alpha-2-antiplasmin	PLI	1
Alpha-amylase		1
Alpha-fetoprotein	AFP	6
Alpha-glucosidase, neutral AB	GANAB	1
Alpha-glucosidase, neutral C	GANC	1
Aminomethyltransferase	AMT	1
Aminopeptidase P	XPNPEP2	1
Amyloid beta (A4) precursor protein-binding, APBB1	APBB1	5
Amyloid beta (A4) precursor protein	APP	5
Androgen binding protein	ABP	2
Androgen receptor	AR	6
Angiotensin converting enzyme	ACE, DCP1	1
Angiotensin receptor 1	AGTR1	2
Angiotensin receptor 2	AGTR2	2
Angiotensinogen	AGT	1
Annexin I	ANX	1
Apurinic endonuclease	APE	1
Arginine vasopressin	AVP	5
Arginine vasopressin receptor 1A	AVPR1A	5
Arginine vasopressin receptor 1B	AVPR1B	5
Arginine vasopressin receptor 2	AVPR2	5
Aryl hydrocarbon receptor	AHR	2
Arylsulfatase E	ARSE	1
Aspartate transcarbamoylase		1
Ataxia teiangiectasia gene, AT	ATM	6
ATP cobalamin adenoxyltransferase		1
ATP sulphurylase	atpsk2	1
ATP/ADP translocase		1
Atrial natriuretic peptide	ANP	6
Atrial natriuretic peptide receptor A	NPR1	6
Atrial natriuretic peptide receptor B	NPR2	6



Atrial natriuretic peptide receptor C	NPR3	6
BCL2-associated X protein	BAX	6
Benzodiazepine receptor		5
Beta-endorphin receptor		5
Bile acid coenzyme A: amino acid N-acyltransferase	BAAT	1
Bile salt export pump	BSEP, PFIC2	2
Bile salt-stimulated lipase	CEL	1
Bilirubin UDP-glucuronosyltransferase		1
Biliverdin reductase		2
Bleomycin hydrolase	BLMH	1
Bradykinin receptor B1		4
Bradykinin receptor B2		4
Breakpoint cluster region	BCR	6
Breast cancer 1	BRCA1	6
Breast cancer 2	BRCA2	6
Brush border guanylyl cyclase		1
Butyrylcholinesterase	BCHE	1
Ca(2+) transporting ATPase, fast twitch	ATP2A1	2
Ca(2+) transporting ATPase, slow twitch	ATP2A2	2
Calcineurin A1	CALNA1	4
Calcineurin A2	CALNA2	4
Calcineurin A3	CALNA3	4
Calcineurin B		
Calcitonin receptor /Calcitonin gene-related peptide receptor	CALCR	5
Calcium channel, voltage-dependent, alpha 1 F subunit	CACNA1F	5
Calcium channel, voltage-dependent, Alpha-1 B (CACNL1A5)	CACNA1B	5
Calcium channel, voltage-dependent, Alpha-1 C	CACNA1C	5
Calcium channel, voltage-dependent, Alpha-1 D	CACNA1D	5
Calcium channel, voltage-dependent, Alpha-1E (CACNL1A6)	CACNA1E	5
Calcium channel, voltage-dependent, Alpha-2/delta	CACNA2	5
Calcium channel, voltage-dependent, Beta 1	CACNBI	5
Calcium channel, voltage-dependent, Beta 3	CACNB3	5
Calcium channel, voltage-dependent, L type, alpha 1S subunit	CACNA1S	5
Calcium channel, voltage-dependent, Neuronal, Gamma	CACNG2	5
Calcium channel, voltage-dependent, P/Q type, alpha 1A subunit	CACNA1A	5
Calcium channel, voltage-dependent, T-type		5

Canalicular multispecific organic anion transporter	CMOAT	2
Cannabinoid receptor	CNR1	5
Carbamoylphosphate synthetase 1	CPS1	1
Carbamoylphosphate synthetase 2	CPS2	1
Carbonic anhydrase 3	CA3	1
Carbonic anhydrase 4	CA4	1
Carbonic anhydrase, alpha	CA1	1
Carbonic anhydrase, beta	CA2	1
Carnitine transporter protein	CDSP, SCD	2
Carnosinase		5
Cartilage-hair hypoplasia gene	CHH	5
Catalase	CAT	4
Catechol-o-methyltransferase	COMT	1
Catenin, beta	CTNNBL	6
Cell adhesion molecule, vascular, VCAM	VCAM1	6
Cholecystokinin	CCK	5
Cholecystokinin B receptor	CCKBR	5
Cholesterol ester transfer protein	CETP	2
Choline acetyltransferase	CHAT	1
CoA transferase		1
Colony-stimulating factor 1	CSF1	6
Colony-stimulating factor 2	CSF2	6
Colony-stimulating factor 3	CSF3	6
Colony-stimulating factor 3 receptor	CSF3R	6
Complex V	MTATP6	1
Coproporphyrinogen oxidase	CPO	1
Cortico-steroid binding protein		2
Corticosteroid nuclear receptor		4
Corticotrophin-releasing hormone receptor	CRHR1	2
Creb binding protein	CREBBP	6
Crystallin, alpha A	CRYAA	3
Crystallin, alpha B	CRYAB	3
Crystallin, beta B2	CRYBB2	3
Crystallin, gamma A	CRYGA	3
Cu <sup>2+</sup> transporting ATPase alpha polypeptide	ATP7A	1
Cu <sup>2+</sup> transporting ATPase beta polypeptide	ATP7B	1
Cyclic AMP response element binding protein	CREB	6
Cyclic AMP response element modulator	CREM	6
Cyclic AMP-dependent protein kinase	PKA	1
Cyclic nucleotide phosphodiesterase 1 B	PDE1B	1
Cyclic nucleotide phosphodiesterase I B I	PDEIB1	1
Cyclic nucleotide phosphodiesterase 2A3	PDE2A3	1
Cyclic nucleotide phosphodiesterase 3A	PDE3A	1
Cyclic nucleotide phosphodiesterase 3B	PDE3B	1
Cyclic nucleotide phosphodiesterase 4A	PDE4A	1
Cyclic nucleotide phosphodiesterase 4C	PDE4C	1

Cyclic nucleotide phosphodiesterase 5A	PDE5A	1
Cyclic nucleotide phosphodiesterase 6A	PDE6A	1
Cyclic nucleotide phosphodiesterase 6B	PDE6B	1
Cyclic nucleotide phosphodiesterase 7	PDE7	1
Cyclic nucleotide phosphodiesterase 8	PDE8	1
Cyclic nucleotide phosphodiesterase 9A	PDE9A	1
Cyclin F	CCNF	6
Cyclin-dependent kinase inhibitor 1 A (P21, cipi)	CDKN1A	6
Cyclooxygenase 1	COX1	1
Cyclooxygenase 2	COX2	1
Cyclophilin		4
CYP11A1	CYP11A1	1
CYP11B1	CYP11B1	1
CYP11B2	CYP11B2	1
CYP17	CYP17	1
CYP19	CYP19	1
CYP1A1	CYP1A1	1
CYP1A2	CYP1A2	1
CYP1B1	cyp1b1	1
CYP21	CYP21	1
CYP24	CYP24	1
CYP27	CYP27	1
CYP27B1	PDDR	1
CYP2A1	CYP2A1	1
CYP2A13	CYP2A1 3	1
CYP2A3	CYP2A3	1
CYP2A6V2	CYP2A6V2	1
CYP2A7	CYP2A7	1
CYP2B6	CYP2B6	1
CYP2C18	CYP2C18	1
CYP2C19	CYP2C19	1
CYP2C8	CYP2C8	1
CYP2C9	CYP2C9	1
CYP2D6	CYP2D6	1
CYP2E1	CYP2E1	1
CYP2F1	CYP2F1	1
CYP2J2	CYP2J2	1
CYP3A3	CYP3A3	1
CYP3A4	CYP3A4	1
CYP3A5	CYP3A5	1
CYP3A7	CYP3A7	1
CYP4A11	GYP4A11	1
CYP4B1	CYP4B1	1
CYP4F2	CYP4F2	1
CYP4F3	CYP4F3	1
CYP51	CYP51	1

CYP5A1	CYP5A1	1
CYP7A	CYP7A	1
CYP8	CYP8	1
Cystic fibrosis transmembrane conductance regulator, CFTR	CFTR	5
Cytidine deaminase	CDA	1
Cytidine-5-prime-triphosphate synthetase	CTPS	1
Cytokine-suppressive antiinflammatory drug- binding protein 1	CSBPL	4
Cytokine-suppressive antiinflammatory drug- binding protein 2	CSBP2	4
Deoxycytidine kinase DCK		1
Deoxyuridine triphosphatase; dUTPase		1
DHEA sulfotransferase	STD	1
Dihydrodiol dehydrogenase 1	DDHL	1
Dihydrofolate reductase	DHFR	1
Dihydrolipoamide branched chain transacylase	DBT	5
Dihydroiipoamide dehydrogenase	DLD	5
Dihydrolipoyl dehydrogenase 2	PDHA	1
Dihydrolipoyl transacetylase	PDHA	1
Dihydroorotase		1
Dihydropyrimidine dehydrogenase	DPYD	1
Disrupted meiotic CDNA 1, homolog	DMC1	6
DNA damage binding protein, DDBI	DDBI	3
DNA damage binding protein, DDB2	DDB2	3
DNA directed polymerase, alpha	POLA	1
DNA glycosylases		1
DNA helicases		1
DNA Ligase 1	LIG1	1
DNA methyltransferase	DNMT	1
DNA polymerase 1		1
DNA polymerase 2		1
DNA polymerase 3		1
DNA primase		1
DNA-damage-inducible transcript 3	DDIT3	3
DNA-dependant RNA polymerase		1
Dopamine receptors Di	DRDI	5
Dopamine receptors D2	DRD2	5
Dopamine receptors D3	DRD3	5
Dopamine receptors D4	DRD4	5
Dopamine receptors D5	DRD5	5
Erythropoietin	EPO	4
Erythropoietin receptor	EPOR	4
Estrogen receptor	ESR	6
Excision repair complementation group 1 protein	ERCCI	1

Excision repair complementation group 2 protein	ERCC2	1
Excision repair complementation group 3 protein	ERCC3	1
Excision repair complementation group 4 protein	ERCC4	1
Excision repair complementation group 6 protein	ERCC6	1
Factor H	HFI	4
Factor IX	F9	4
Factor VII	F7	4
Factor VIII	F8	4
Factor X	F10	4
Fatty acid binding proteins FABPL		2
Fatty acid binding proteins FABP2		2
Fatty acid binding proteins FABP3		2
Fatty acid binding proteins FABP4		2
Fatty acid binding proteins FABP5		2
Fatty acid binding proteins FABP6		2
Fibroblast growth factor	FGF1	6
Flavin-containing monooxygenase 1	FMO1	1
Flavin-containing monooxygenase 2	FMO2	1
Flavin-containing monooxygenase 3	FMO3	1
Flavin-containing monooxygenase 4	FMO4	1
Folic acid receptor	FOLR	6
Follicle stimulating hormone receptor	FSHR,ODG1	6
Follicle stimulating hormone, FSH	FSHB	6
Forkhead transcription factor 10	FKHL10	6
Forkhead transcription factor 14	FKHL14	6
Forkhead transcription factor 7	FKHL7	6
G/T mismatch binding protein	GTBP,MSH6	6
GABA receptor, alpha 1	GABRA1	5
GABA receptor, alpha 2	GABRA2	5
GABA receptor, alpha 3	GABRA3	5
GABA receptor, alpha 4	GABRA4	5
GABA receptor, alpha 5	GABRA5	5
GABA receptor, alpha 6	GABRA6	5
GABA receptor, beta 1	GABRB1	5
GABA receptor, beta 2	GABRB2	5
GABA receptor, beta 3	GABRB3	5
GABA receptor, gamma 1	GABRG1	5
GABA receptor, gamma 2	GABRG2	5
GABA receptor, gamma 3	GABRG3	5
GABA transaminase	ABAT	1
Gadd45 (growth arrest & DNA-damage-inducible protein)		1
Galactose 1-phosphate uridyl-transferase	GALT	1
Gamma-glutamyl carboxylase	GGCX	2

Gamma-glutamyltransferase I	GGTL	2
Gamma-glutamyltransferase 2	GGT2	2
Gastric inhibitory polypeptide receptor, GIPR	GIPR	2
Gastric lipase, LIPF		2
Glucagon receptor	GCGR	6
Glucocorticoid receptor	GRL	6
Glucosaminyl (N-acetyl) transferase 2, I-branching enzyme	GCNT2	1
Glucosidase, acid beta	GBA	1
Glutamate decarboxylase, GAD	GAD1	1
Glutamate receptor 1	GLUR1	5
Glutamate receptor 2	GLUR2	5
Glutamate receptor 3	GLUR3	5
Glutamate receptor 4	GLUR4	5
Glutamate receptor 5	GLUR5	5
Glutamate receptor 6	GLUR6	5
Glutamate receptor 7	GLUR7	5
Glutamate receptor, ionotropic, NMDA 1	NMDAR1	5
Glutamate receptor, ionotropic, NMDA 2A	NMDAR2A	5
Glutamate receptor, ionotropic, NMDA 2B	NMDAR2B	5
Glutamate receptor, ionotropic, NMDA 2C	NMDAR2C	5
Glutamate receptor, ionotropic, NMDA 2D	NMDAR2D	5
Glutamine phosphoribosylpyrophosphate amidotransferase/PRPP amidotransferase		1
Glutathione	GSH	2
Glutathione peroxidase, GPXL	GPXI	1
Glutathione peroxidase, GPX2	GPX2	1
Glutathione reductase, GSR	GSR	1
Glutathione S-transferase mu 1, GSTM1	GSTM1	1
Glutathione S-transferase mu 4, GSTM4		1
Glutathione S-transferase theta 1, GSTT1	GSTT1	1
Glutathione S-transferase theta 2, GSTT2		1
Glutathione S-transferase, GSTP1	GSTP1	1
Glutathione S-transferase, GSTZ1	GSTZ1	1
Glutathione synthetase	GSS	1
Glyceraldehyde-3-phosphate dehydrogenase, GAPDH	GAPDH	1
Glycinamide ribanucleotide (GAR) transformylase	GART	1
Glycine receptor, alpha	GLRA2	5
Glycine receptor, beta		5
Glycine transporter	GLYT	5
Gonadotropin releasing hormone	GNRH	6
Gonadotropin releasing hormone receptor	GNRHR	6
Growth arrest-specific homeobox	GAX	6
Growth hormone I	GHI	6
Growth hormone 2 (placental)	GH2	6

Growth hormone receptor	GHR	6
Growth hormone releasing hormone (GHRH)	GHRH	6
Growth hormone releasing hormone receptor	GHRHR	6
GTP cyclohydrolase I	GCHI	6
GTPase-activating protein, GAP	RASAI	6
Guanidinoacetate N-methyltransferase	GAMT	1
Guanine nucleotide-binding protein, alpha activating activity polypeptide, GNAO	GNA01	5
Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 1, GNAI1	GNAI1	5
Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 2, GNAI2	GNAI2	5
Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 3, GNAI3	GNAI3	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS1	GNAS1	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS2	GNAS2	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS3	GNAS3	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS4	GNAS4	5
Guanine nucleotide-binding protein, alpha transducing activity polypeptide, GNAT1	GNATI	5
Guanine nucleotide-binding protein, alpha transducing activity polypeptide, GNAT2	GNAT2	5
Guanine nucleotide-binding protein, beta polypeptide 3	GNB3	5
Guanine nucleotide-binding protein, gamma polypeptide 5	GNG5	5
Guanine nucleotide-binding protein, polypeptide	GNAQ	5
Guanylate cyclase 2D, membrane (retina-specific)	GUCY2D	1
Guanylate cyclase activator 1A (retina)	GUCALA	1
Guanylate kinase		1
Guanylin	GUCA2	2
Guanylyl cyclase		1
H(+), K(+) - ATPase	ATP4B	5
Heat shock protein, HSP60		4
Heat shock protein, HSP70		4
Heat shock protein, HSP90		4
Hemopexin	HPX	4
Hepatic lipase	LIPC	1
Histamine receptors, H1		5
Histamine receptors, H2		5
Histamine receptors, H3		5

HLH transcription factor HAND1	HAND1	6
HLH transcription factor HAND2	HAND2	6
HMG-CoA lyase	HMGCL	1
HMG-CoA reductase	HMGCR	1
HMG-CoA synthase	HMGCS2	1
Hormone-sensitive lipase	HSL	1
HSSB, replication protein		1
Hypoxanthine-guanine phosphoribosyltransferase, HGPRT	HPRT	1
Ibonucleoside diphosphate reductase		1
Ikaros gene	IKAROS	6
Inosine monophosphate dehydrogenase	IMPDH	1
Inosine triphosphatase	ITPA	1
Inositol monophosphatase	IMPAL	5
Insulin	INS	6
Insulin receptor	INSR	6
Insulin-like growth factor 1 receptor	IGF1R	6
Insulin-like growth factor 2 receptor	IGF2R	6
Interferon alpha	IFNAL	4
Interferon beta	IFNB	4
Interferon gamma	IFNG	4
Interferon gamma receptor 1	IFNGR1	4
Interferon gamma receptor 2	IFNGR2	4
Interferon regulatory factor 1	IRF1	4
Interferon regulatory factor 4	IRF4	4
Interleukin(IL) 1 receptor	IL1R	4
Interleukin(IL) 1, alpha	IL1A	4
Interleukin(IL) 1, beta	IL1B	4
Interleukin(IL) 10	IL10	4
Interleukin(IL) 10 receptor	IL10R	4
Interleukin(IL) II	IL11	4
Interleukin(IL) 11 receptor	IL11R	4
Interleukin(IL) 12	IL12	4
Interleukin(IL) 12 receptor, beta I	IL12RB1	4
Interleukin(IL) 13	IL13	4
Interleukin(IL) 13 receptor	IL13R	4
Interleukin(IL) 2	IL2	4
Interleukin(IL) 2 receptor, alpha	IL2RA	4
Interleukin(IL) 2 receptor, gamma	IL2RG	4
Interleukin(IL) 3	IL3	4
Interleukin(IL) 3 receptor	IL3R	4
Interleukin(IL) 4	IL4	4
Interleukin(IL) 4 receptor	IL4R	4
Interleukin(IL) 5	IL5	4
Interleukin(IL) 5 receptor	IL5R	4
Interleukin(IL) 6	IL6	4
Interleukin(IL) 6 receptor	IL6R	4



Interleukin(IL) 7	IL7	4
Interleukin(IL) 7 receptor	IL7R	4
Interleukin(IL) 8	IL8	4
Interleukin(IL) 8 receptor	IL8R	4
Interleukin(IL) 9	IL9	4
Interleukin(IL) 9 receptor	IL9R	4
Interleukin(IL) receptor antagonist 1	IL1RN, IL1RA	4
Kallikrein 3	KAK3	4
Kinectin	KTNL	6
Kinesin, heavy chain	KNSLI	6
Kinesin, light chain	KNS2	6
Kininogen, High molecular weight	KNG	4
Leptin	LEP	6
Leptin receptor	LEPR	6
Leukotriene A4 hydrolase		4
Leukotriene B4 receptor		4
Leukotriene C4 receptor		4
Leukotriene D4/E4 receptor		4
LH/choriogonadotropin (CG) receptor	LHCGR	6
LIM homeobox transcription factor 1, beta	LMXL B	6
Lipoprotein lipase	LPL	4
Lipoprotein receptor, Low Density	LDLR	2
Lipoxygenase 12 (platelets)	LOG12	4
Lipoxygenase 5 (leukocytes)		4
Low density lipoprotein receptor-related protein precursor	LRP	2
Lysosomal acid lipase	LIPA	1
Malonyl CoA decarboxylase		1
Malonyl CoA transferase		1
Maltase-glucoamylase		1
Mannose binding protein	MBP	4
Mannosyl-(alpha-1,6-)-glycoprotein beta-1, 2-N-acetylglucosaminyltransferase	MGAT2	2
MAPK kinase 1	MAPKK1; MEK1	6
MAPK kinase 4	MAPKK4; MEK4; SERKI	6
MAPK kinase 6	MAPKK6; MEK6	6
MAPKK kinase	MAPKKK	6
Matrix Gla protein	MGP	6
MEK kinase, MEKK		1
Melanocortin 2 receptor	MC2R	2
Melanocortin 4 receptor	MC4R	2
Methionine adenosyltransferase	MAT1A, MAT2A	1
Methionine synthase	MTR	1
Methionine synthase reductase	MTRR	1
Methylguanine-DNA methyltransferase	MGMT	1
Mevalonate kinase	MVK	1

MHC Class I: Tap1	ABCR, TAP1	4
MHC Class II: Tap2	TAP2,PSF2	4
Microphthalmia-associated transcription factor	MITF	6
Mismatch repair gene, PMSL1	PMS1	6
Mismatch repair gene, PMSL2	PMS2	6
Mitochondrial trifunctional protein, alpha. subunit	HADHA	1
Mitochondrial trifunctional protein, beta subunit	HADHB	1
Mitogen-activated protein (MAP) kinase	MAPK	6
Monoamine oxidase A	MAOA	1
Monoamine oxidase B	MAOB	1
Multidrug resistance associated protein	MRP	6
Muscarinic receptor, M1	CHRM1	5
Muscarinic receptor, M2	CHRM2	5
Muscadnic receptor, M3	CHRM3	5
Muscarinic receptor, M4	CHRM4	5
Muscarinic receptor, M5	CHRM5	5
Na <sup>+</sup> , K <sup>+</sup> ATPase, alpha	ATPIAI	6
Na <sup>+</sup> , K <sup>+</sup> ATPase, beta 1	ATPIBI	6
Na <sup>+</sup> , K <sup>+</sup> ATPase, beta 2	ATPIB2	6
Na <sup>+</sup> , K <sup>+</sup> ATPase, beta 3	ATP1B3	6
Na <sup>+</sup> /H <sup>+</sup> exchanger 1	NHFI	2
Na <sup>+</sup> /H <sup>+</sup> exchanger 2	NHE2	2
Na <sup>+</sup> /H <sup>+</sup> exchanger 3	NHE3	2
Na <sup>+</sup> /H <sup>+</sup> exchanger 4	NHE4	2
Na <sup>+</sup> /H <sup>+</sup> exchanger 5	NHE5	2
N-acetylgalactosamine-6-sulfate sulfatase	GALNS	1
N-acetylglucosamine-6-sulfatase	GNS	1
N-acetylglucosaminidase, alpha	NAGLU	1
N-acetyltransferase 1	NATI	1
N-acetyltransferase 2	NAT2	1
N-acyl hydrolase		4
NADH dehydrogenase (ubiquinone) Flavoprotein I	NDUFVL	1
NADH-cytochrome b5 reductase	DIA1	1
Nephrolithiasis 2	NPHL2	2
Nephronophthisis 2	NPHP2	2
Nephrosis 1	NPHSI	2
Neuroendocrine convertase 1	NEC1,PCSK1	1
Neurokinin A	NKNA	5
Neurokinin B	NKNB	5
Neuropeptide Y	NPY	5
Neuropeptide Y receptor Y1	NPYLR	5
Neuropeptide Y receptor Y2	NPY2R	5
Niacin receptor		6
Niemann-Pick disease protein	NPCL	2
Nuclear factor kappa beta	NFKB	4

Nuclear factor of activated T cells (NFAT) complex, cytosolic	NFATC	6
Nuclear factor of activated T cells (NFAT) complex, preexisting component	NFATP	6
Nucleoside diphosphate kinase-A	NDPKA	1
Oncogene spil		6
Opioid receptor, delta	OPRDI	5
Opioid receptor, kappa	OPRK1	5
Opioid receptor, mu	OPRM1	5
Ornithine transcarbamoylase	OTC, NME1	1
Osteoprotegerin	OPG	6
Otoferlin	OTOF	5
Oxytocin	OXT	5
Oxytocin receptor	OXTR	5
Paired-like homeodomain transcription factor 2	PITX2	6
Paired-like homeodomain transcription factor 3	PITX3	6
Paraoxonase PON1	PON1	1
Paraoxonase PON2	PON2	1
Paraoxonase PON3	PON3	1
Parathyroid hormone	PTH	6
Parathyroid hormone receptor	PTHR1	6
Parathyroid hormone related-peptide	PTHRP	6
Parathyroid hormone-like hormone	PTHLH	6
Parvalbumin	PVALB	6
PCNA (proliferating cell nuclear antigen)		1
Peanut-like	PNUTLI	4
Peroxisomal membrane protein I	Pxmp1	3
Peroxisome biogenesis factor 1	PEX1	2
Peroxisome biogenesis factor 19	PEX19	2
Peroxisome biogenesis factor 6	PEX6	2
Peroxisome biogenesis factor 7	PEX7	2
Peroxisome proliferative activated receptor, alpha	PPARA	2
Peroxisome proliferative activated receptor, gamma	PPARG	2
P-glycoprotein 1	PGY1	2
P-glycoprotein 3	PGY3	2
Phenylethanolamine N-methyltransferase, PNMT	PNMT	1
Phosphodiesterase 1 / nucleotide pyrophosphatase I	PDNPI	6
Phosphodiesterase I / nucleotide pyrophosphatase 2	PDNP2	6
Phosphodiesterase 1 / nucleotide pyrophosphatase 3	PDNP3	6
Phospholipase A2, group 10	PLA2G 10	4
Phospholipase A2, group 1B	PLA2G 1B	4

Phospholipase A2, group 2A	PLA2G2A	4
Phospholipase A2, group 2B	PLA2G2B	4
Phospholipase A2, group 4A	PLA2G4A	4
Phospholipase A2, group 4C	PLA2G4C	4
Phospholipase A2, group 5	PLA2G5	4
Phospholipase A2, group 6	PLA2G6	4
Phospholipase C alpha		4
Phospholipase C beta		4
Phospholipase C delta	PLCD1	4
Phospholipase C epsilon		4
Phospholipase C gamma	PLCG1	4
Phosphomannomutase-2	PMM2	2
Phosphomannose isomerase-1, PMI I	MPI	2
Phosphoribosyl pyrophosphate synthetase	PRPS1	1
Pituitary adenylate cyclase activating peptide	PACAP	5
Pituitary adenylate cyclase activating peptide receptor	PACAPLR	5
Plasminogen activator, Tissue	PLAT, TPA	1
Platelet-activating factor receptor	PAFR	4
Plectin I	PLEC1	2
Polycystin 1	PKD1	2
Polycystin 2	PKD2	2
Porphobilinogen deaminase	HMBS	1
Potassium channel, calcium-activated,	KCNN4	5
Potassium channel, subfamily K, member 1	KCNK1	5
Potassium channel, subfamily K, member 2	KCNK2	5
Potassium channel, subfamily K, member 3	KCNK3	5
Potassium inwardly-rectifying channel JI	KCNJ1	5
Potassium inwardly-rectifying channel JII	KCNJ11	5
Potassium voltage-gated channel AI	KCNA1	5
Potassium voltage-gated channel EI	KCNE1	5
Potassium voltage-gated channel QI	KCNQ1	5
Potassium voltage-gated channel Q2	KCNQ2	5
Potassium voltage-gated channel Q3	KCNQ3	5
POU domain, class 1, transcription factor I (Piti)	POU1F1	6
POU domain, class 3, transcription factor 4	POU3F4	6
POU domain, class 4, transcription factor 3	POU4F3	6
Pre-B-cell leukemia transcription factor 1	PBx1	6
Preproglucagon receptor)	GCG, GLP1, GLP2	6
Prolactin	PRL	6
Prolactin receptor	PRLR	6
Proopiomelanocortin	POMC	5
Prostacyclin synthase		4
Prostaglandin 15-OH dehydrogenase	HGPD, PGDH	4
Prostaglandin D-DP receptor		4

Prostaglandin E1 receptor		4
Prostaglandin E2 receptor		4
Prostaglandin E3 receptor		4
Prostaglandin F-FP receptor		4
Prostaglandin F2 alpha receptor		4
Prostaglandin IP receptor		4
Prostaglandin-endoperoxidase synthase 2	PTGS2	6
Protease nexin 2	PN2	1
Protein C	PROC	4
Protein kinase DNA-activated	PRKDC	1
Protein S	PROS1	4
Pterin-4-alpha-carbinolamine	PCBD	
Purine nucleoside phosphorylase	NP	1
Purinergic receptor P1A1		5
Purinergic receptor P1A2		5
Purinergic receptor P1A3		5
Purinergic receptor P2X, 1	P2RX1	5
Purinergic receptor P2X, 2	P2RX2	5
Purinergic receptor P2X, 3	P2RX3	5
Purinergic receptor P2X, 4	P2RX4	5
Purinergic receptor P2X, 5	P2RX5	5
Purinergic receptor P2X, 6	P2RX6	5
Purinergic receptor P2X, 7	P2RX7	5
Purinergic receptor P2Y, 1	P2RY1	5
Purinergic receptor P2Y, 11	P2RY11	5
Purinergic receptor P2Y, 2	P2RY2	5
RAD51, DNA repair protein	RAD51	6
RAD52, DNA repair protein	RAD52	6
RAD54, DNA repair protein	RAD54	6
RAD55, DNA repair protein	RAD55	6
RAD57, DNA repair protein	RAD57	6
Recombination activating gene 1	RAG1	6
Recombination activating gene 2	RAG2	6
Red cone pigment	RCP	3
Replication factor A		1
Replication factor C	RFC2	1
Retinaldehyde binding protein 1	RLBPL	2
Retinoic acid receptor, alpha	RARA	6
Retinoic acid receptor, beta	RARB	6
Retinoic acid receptor, gamma	RARG	6
Retinoid X receptor, alpha	RXRA	6
Retinoid X receptor, beta	RXRB	6
Retinoid X receptor, gamma	RG	6
Retinol binding protein 1		2
Retinol binding protein 2		2
Retinol binding protein 4	RBP4	2
Ribonucleotide reductase, RRM		1

Ribosephosphate pyrophosphokinase		1
Ribosomal protein L13A	RPL13A	6
Ribosomal protein S19	RPS19	1
Ribosomal protein S4, X-linked	RPS4X	1
Ribosomal protein S6 kinase	RPS6KA3	1
Ribosomal protein S9	RPS9	6
S-Adenosylmethionine decarboxylase, AMD		1
Secretin	SCT	2
Secretin receptor, SCTR	SCTR	2
Serine hydroxymethyltransferase	SHMT	1
Serotonin-N-acetyltransferase	SNAT	1
Serotonin receptor, 5HT1A	HTR1A	5
Serotonin receptor, 5HT1B	HTR1B	5
Serotonin receptor, 5HT1C	HTR1C	5
Serotonin receptor, 5HT1D	HTR1D	5
Serotonin receptor, 5HT1E	HTR1E	5
Serotonin receptor, 5HT1F	HTR1F	5
Serotonin receptor, 5HT2A	HTR2A	5
Serotonin receptor, 5HT2B	HTR2B	5
Serotonin receptor, 5HT2C	HTR2C	5
Serotonin receptor, 5HT3	HTR3	5
Serotonin receptor, 5HT4	HTR4	5
Serotonin receptor, 5HT5	HTR5	5
Serotonin receptor, 5HT6	HTR6	5
Serotonin receptor, 5HT7	HTR7	5
Slug protein		6
Small nuclear ribonucleoprotein polypeptide N	SNRPN	3
Sodium channel, non-voltage gated 1, alpha	SCNNA	5
Sodium channel, non-voltage gated 1, beta	SCNN1B	5
Sodium channel, non-voltage gated 1, gamma	SCNN1G	5
Sodium channel, voltage gated, type IV, alpha polypeptide	SCN4A	5
Sodium channel, voltage gated, type V, alpha polypeptide	SCN5A	5
Sodium channel, voltage gated, type 1, beta polypeptide	SCN1B	5
Solute carrier family 1 (amino acid transporter), SLC1A6 member 6		2
Solute carrier family 1 (glial high affinity glutamate transporter), member 3	SLC1A3	2
Solute carrier family 1 (glutamate transporter), member 1	SLC1A1	2
Solute carrier family I (glutamate transporter), SLC1A2 member 2		2
Solute carrier family 1(neutral amino acid transporter), member 4	SLC1A4	2

Solute carrier family 10 (sodium/bile acid cotransporter family), member 1	SLC10A1	2
Solute carrier family 10 (sodium/bile acid cotransporter family), member 2	SLC10A2	2
Solute carrier family 12, member 1	SLC12A1	2
Solute carrier family 12, member 2	SLC12A2	2
Solute carrier family 12, member 3	SLC12A3	2
Solute carrier family 14, member 2	SLC14A2	2
Solute carrier family 15 (H <sup>+</sup> /peptide transporter, intestinal), member 1	SLC15A1	2
Solute carrier family 15 (H <sup>+</sup> /peptide transporter, kidney), member 2	SLC15A2	2
Solute carrier family 16 (monocarboxylate transporter), member 1	SLC16A1	2
Solute carrier family 16 (monocarboxylate transporter), member 7	SLC16A7	2
Solute carrier family 17, member 1	SLC17A1	2
Solute carrier family 17, member 2	SLC17A2	2
Solute carrier family 18, member 3	SLC18A3	2
Solute carrier family 19 (folate transporter), member 1	SLC19A1	2
Solute carrier family 2 (facilitated glucose transporter), member 1	SLC2A1	2
Solute carrier family 2 (facilitated glucose transporter), member 2	SLC2A2	2
Solute carrier family 2 (facilitated glucose transporter), member 3	SLC2A3	2
Solute carrier family 2 (facilitated glucose transporter), member 4	SLC2A4	2
Solute carrier family 2 (facilitated glucose transporter), member 5	SLC2A5	2
Solute carrier family 20, member 1	SLC20A1	2
Solute carrier family 20, member 2	SLC20A2	2
Solute carrier family 20, member 3	SLC20A3	2
Solute carrier family 21, member 2	SLC21A2	2
Solute carrier family 21, member 3	SLC21A3	2
Solute carrier family 22, member 1	SLC22A1	2
Solute carrier family 22, member 2	SLC22A2	2
Solute carrier family 22, member 5	SLC22A5	2
Solute carrier family 25, member 12	SLC25A12	2
Solute carrier family 3 (facilitated glucose transporter), member 1	SLC3A1	2
Solute carrier family 4 (anion exchanger), member 1	SLC4A1	2
Solute carrier family 4 (anion exchanger), member 2	SLC4A2	2

Solute carrier family 4 (anion exchanger), member 3	SLC4A3	2
Solute carrier family 5 (sodium/glucose transporter), member 1	SLC5A1	2
Solute carrier family 5 (sodium/glucose transporter), member 2	SLC5A2	2
Solute carrier family 5 (sodium/glucose transporter), member 5	SLC5A5	2
Solute carrier family 5, member 3	SLC5A3	2
Solute carrier family 6 (GAMMA-AMINO BUTYRIC ACID transporter), member 1	SLC6A1	2
Solute carrier family 6 (neurotransmitter transporter, dopamine), member 3	SLC6A3	2
Solute carrier family 6 (neurotransmitter transporter, noradrenaline), member 2	SLC6A2	2
Solute carrier family 6 (neurotransmitter transporter, serotonin), member 4	SLC6A4	2
Solute carrier family 6, member 10	SLC6A10	2
Solute carrier family 6, member 6	SLC6A6	2
Solute carrier family 6, member 8	SLC6A8	2
Solute carrier family 7 (amino acid transporter), member 1	SLC7A1	2
Solute carrier family 7 (amino acid transporter), member 2	SLC7A2	2
Solute carrier family 7 (amino acid transporter), member 7	SLC7A7	2
Solute carrier family 8 (sodium/calcium exchanger), member 1	SLC8A1	2
Somatostatin	SST	5
Somatostatin receptor, SSTR1	SSTR1	5
Somatostatin receptor, SSTR2	SSTR2	6
Somatostatin receptor, SSTR3	SSTR3	5
Somatostatin receptor, SSTR4	SSTR4	5
Somatostatin receptor, SSTR5	SSTR5	5
Sorcin	SRI	2
SOSI guanine nucleotide exchange factor	sosi	6
Steroid 5 alpha reductase 1	SRD5A1	1
Steroid 5 alpha reductase 2	SRD5A2	1
Steroid hormone receptor responsive DNA elements		6
Sterol carrier protein 2	SCP2	2
Succinic semi-aldehyde dehydrogenase	SSADH	1
Sucrase		1
Sulfonylurea receptor	SUR	6
Synaptic vesicle amine transporter	SVAT	5
Tachykinin receptor, NK1R	TACR1	5
Tachykinin receptor, NK2R	TACR2	5



Tachykinin receptor, NK3R	TACR3	5
Terminal deoxynucleotidyltransferase	TDT	4
Thiopurine-S-methyltransferase	TPMT	1
Thrombopoietin	THPO	6
Thromboxane A synthase I	TBXASI	4
Thromboxane A2	TXA2	4
Thromboxane A2 receptor	TBXA2R	4
Thymidylate synthase	TYMS	1
Thymopoietin	TMPO	6
Thyroid hormone receptor, beta	THRB	6
Thyroid-stimulating hormone receptor	TSHR	6
Thyroid-stimulating hormone, alpha	TSHA	6
Thyroid-stimulating hormone, beta	TSHB	6
Topoisomerase I		1
Topoisomerase II		1
Transcription factor 1, hepatic	TCF1	6
Transcription factor 2, hepatic	TCF2	6
Transcription factor 3	TCF3	6
Transcription factor binding to IGHM enhancer 3	TFE3	6
Transcription factor, TUPLE1	TUPLE1	5
Transcription termination factor, RNA polymerase 1	TTF1	6
Transcription termination factor, RNA polymerase 2	TTF2	6
Transcription termination factor, RNA polymerase 3	TTF3	6
Transferrin	TF	6
Transferrin receptor	TFRC	6
Transthyretin	TTR	2
Tubulin		3
Tumour necrosis factor (TNF) receptor associated factor 1	TRAF1	4
Tumour necrosis factor (TNF) receptor associated factor 2	TRAF2	4
Tumour necrosis factor (TNF) receptor associated factor 3	TRAF3	4
Tumour necrosis factor (TNF) receptor associated factor 4	TRAF4	4
Tumour necrosis factor (TNF) receptor associated factor 5	TRAF5	4
Tumour necrosis factor (TNF) receptor associated factor 6	TRAF6	4
Tumour necrosis factor alpha	TNFA	4
Tumour necrosis factor alpha receptor	TNFAR	4
Tumour necrosis factor beta	TNFB	4
Tumour necrosis factor beta receptor	TNFR	4

Tumour protein p53	TP53,P53	6
Tumour protein p63	TP63	6
Tumour Suppressor gene DRA	DRA	4
Ubiquitin		6
Ubiquitin activating enzyme, E1		1
Ubiquitin B	UBB	6
Ubiquitin C	UBC	6
Ubiquitin carboxyl-terminal esterase L1	UCHL1	6
Ubiquitin protein ligase E3A	UBE3A	1
UDP-glucose pyrophosphorylase		1
UDP-glucuronosyltransferase 1	ugtld, UGTL	1
UDP-glucuronosyltransferase 2	UGT2	1
Uncoupling protein 1		2
Uncoupling protein 3	UCP3	2
Uridine monophosphate kinase	UMPK	4
Uridine manophosphate synthetase	UMPS	4
Uridinediphosphate(UDP)-galactose-4-epimerase	GALE	1
Vimentin	VIM	4
Vitamin B12-binding (R) protein		6
Vitamin D receptor	VDR	6
Xanthine dehydrogenase	XDH	1
Xeroderma pigmentosum, complementation group A	XPA	1
Xeroderma pigmentosum, complementation group B	XPB	1
Xeroderma pigmentosum, complementation group C	XPC	1
Xeroderma pigmentosum, complementation group D		1
Xeroderma pigmentosum, complementation group E		1
Xeroderma pigmentosum, complementation group F	XPF	1
Xeroderma pigmentosum, complementation group G	ERCC5	1
X-ray repair gene	XRCC9	6
Xylitol dehydrogenase		1
YY1 transcription factor	YY1	6

## Legende für die Spalte Proteinfunktion:

1	Enzym	2	Transport und Lagerung
3	Struktur	4	Immunität
5	Nervale Transmission	6	Wachstum und Differenzierung

**Tabelle 2**  
**Krebs**

<b>Liste der Gene</b>	<b>HUGO Gensymbol</b>	<b>Protein- funktion</b>
Absent in melanoma 1 gene	AIM1	6
Actin, alpha, cardiac	ACTC	3
Actin, alpha, skeletal	ACTA1	3
Actin, alpha, smooth, aortic	ACTA2	3
Activin		6
Activin A receptor, type 2B	ACVR2B	6
Activin A receptor, type 2-like kinase 1	ACVRL1	6
Adenomatous polyposis coli tumour supressor gene	APC	6
Adenosine deaminase	ADA	1
Adenosine receptor A1	ADORA1	5
Adenosine receptor A2A	ADORA2A	5
Adenosine receptor A2B	ADORA2B	5
Adenosine receptor A3	ADORA3	5
Adenyl cyclase		5
Adenylate cyclase 1	ADCY1	1
Adenylate cyclase 2	ADCY2	1
Adenylate cyclase 3	ADCY3	1
Adenylate cyclase 4	ADCY4	1
Adenylate cyclase 5	ADCY5	1
Adenylate cyclase 6	ADCY6	1
Adenylate cyclase 7	ADCY7	1
Adenylate cyclase 8	ADCY8	1
Adenylate cyclase 9	ADCY9	1
Adrenergic receptor, alpha1	ADRA1	5
Adrenergic receptor, alpha2	ADRA2	5
Adrenergic receptor, beta1	ADRB1	5
Adrenergic receptor, beta2	ADRB2	5
Adrenergic receptor, beta3	ADRB3	5
Adrenocorticotrophic hormone (ACTH) receptor	ACTHR	6
Albumin, ALB	ALB	2
Alcohol dehydrogenase 3	ADH3	1
Aldehyde dehydrogenase 1	ALDH1	1
Aldehyde dehydrogenase 10	ALDH10	1
Aldehyde dehydrogenase 2	ALDH2	1
Aldehyde dehydrogenase 5	ALDH5	1
Aldehyde dehydrogenase 6	ALDH6	1
Aldehyde dehydrogenase 7	ALDH7	1
Aldosterone receptor	MLR	6
alpha tectorin	TECTA	6

alpha1-antitrypsin	PI	1
alpha-actinin 2	ACTN2	6
alpha-actinin 3	ACTN3	6
Alpha-fetoprotein	AFP	6
alpha-synuclein	SNCA	5
Amphiregulin	AREG	6
Amyloid beta A4 precursor protein	APP	5
Amyloid beta A4 precursor-like protein	APLP	5
Androgen receptor	AR	6
Angiopoietin 1	ANGPT1	6
Angiopoietin 2	ANGPT2	6
Angiotensin converting enzyme	ACE, DCP1	1
Angiotensin receptor 1	AGTR1	2
Angiotensin receptor 2	AGTR2	2
Angiotensinogen	AGT	1
Annexin 1	ANX 1	4
Antidiuretic hormone receptor	ADHR	2
Antithrombin III	AT3	1
AP-2, alpha	TFAP2A	6
AP-2, beta	TFAP2B	6
AP-2, gamma	TFAP2C	6
Apaf-1		3
Apoptosis antigen 1	APT1	4
Apoptosis antigen ligand 1	APT1LG 1	4
Apoptosis-inducing factor	AIF	4
Apurinic endonuclease	APE	1
Arginine vasopressin	AVP	5
Arginosuccinate synthetase	ASS	1
Aryl hydrocarbon receptor	AHR	2
Aryl hydrocarbon receptor nuclear translocator	ARNT	2
Asparagine synthetase	AS	1
Aspartate receptor		5
Ataxia telangiectasia complementation group D	ATD, ATDC	6
Ataxia telangiectasia gene, AT	ATM	6
ATP cobalamin adenosyltransferase		1
ATP sulphurylase	atpsk2	1
ATP-binding cassette transporter 7	ABC7	4
Atrial natriuretic peptide	ANP	6
Atrial natriuretic peptide receptor A	NPR1	6
Atrial natriuretic peptide receptor B	NPR2	6
Atrial natriuretic peptide receptor C	NPR3	6
Atrophin 1	DRPLA	6
Bagpipe homeobox, drosophila homolog of, 1	BAPX1	6
B-cell CLL/lymphoma 1	BCL1	4
B-cell CLL/lymphoma 10	BCL10	4
B-cell CLL/lymphoma 3	BCL3	4
B-cell CLL/lymphoma 4	BCL4	4

B-cell CLL/lymphoma 5	BCL5	4
B-cell CLU[lymphoma 6	BCL6	4
B-cell CLL/lymphoma 7	BCL7	4
B-cell CLUlymphoma 8	BCL8	4
B-cell CLL/lymphoma 9	BCL9	4
BCL2-associated X protein	BAX	6
BCL2-related protein A1	BCL2A1	6
Beckwith-Wiedemann region 1A	BWR1A	6
Benzodiazepine receptor		5
beta 2 microglobulin	B2M	4
beta-endorphin receptor		5
beta-synuclein	SNCB	5
Bleomycin hydrolase	BLMH	1
Bone morphogenetic protein, BMP1	BMP1	6
Bone morphogenetic protein, BMP2	BMP2	6
Bone morphogenetic protein, BMP3	BMP3	6
Bone morphogenetic protein, BMP4	BMP4	6
Bone morphogenetic protein, BMP5	BMP5	6
Bone morphogenetic protein, BMP6	BMP6	6
Bone morphogenetic protein, BMP7	BMP7	6
Bone morphogenetic protein, BMP8	BMP8	6
Bradykinin receptor B1		4
Bradykinin receptor B2		4
Brain derived neurotrophic factor	BDNF	6
Brain derived neurotrophic factor (BDNF) receptor	BDNFR	6
Branched chain aminotransferase 1, cytosolic	BCAT1	1
Branched chain aminotransferase 2, mitochondrial	BCAT2	1
BRCA1-associated RING domain gene 1	BARD1	6
Breakpoint cluster region	BCR	6
Breast cancer 1	BRCA1	6
Breast cancer 2	BRCA2	6
Breast cancer, ductal, 1	BRCD1	6
Breast cancer, ductal, 2	BRCD2	6
Bruton agammaglobulinaemia tyrosine kinase	BTK	6
C1 inhibitor		1
Cadherin E	CDH1	6
Cadherin EP		6
Cadherin N	CDH2	6
Cadherin P	CDH3	6
Calbindin I	CALBI	6
Calbindin D9K-	CALB3	6
Calcitonin receptor /Calcitonin gene-related peptide receptor	CALCR	5
Calcitonin/Calcitonin gene-related peptide alpha	CALCA	5

Calcium channel, voltage-dependent, alpha 1 F subunit	CACNA1F	5
Calcium channel, voltage-dependent, Alpha-1B (CACNL1A5)	CACNA1B	5
Calcium channel, voltage-dependent, Alpha-1C	CACNA1C	5
Calcium channel, voltage-dependent, Alpha-1 D	CACNA1D	5
Calcium channel, voltage-dependent, Alpha-1 E (CACNL1A6)	CACNA1E	5
Calcium channel, voltage-dependent, Alpha-2/delta	CACNA2	5
Calcium channel, voltage-dependent, Beta 1	CACNB1	5
Calcium channel, voltage-dependent, Beta 3	CACNB3	5
Calcium channel, voltage-dependent, L type, alpha 1S subunit	CACNA1S	5
Calcium channel, voltage-dependent, Neuronal, Gamma	CACNG2	5
Calcium channel, voltage-dependent, P/Q type, alpha 1A subunit	CACNA1A	5
Calcium channel, voltage-dependent, T-type		5
Calmodulin 1	CALM1	6
Calmodulin 2	CALM2	6
Calmodulin 3	CALM3	6
Calmodulin-dependant protein kinase 11	CAMK2A	6
Calnexin	CANX	6
Carbonic anhydrase 3	CA3	1
Carbonic anhydrase 4	CA4	1
Carbonic anhydrase, alpha	CA1	1
Carbonic anhydrase, beta	CA2	1
Cardiac-specific homeobox, CSX	CSX	6
Cartilage-hair hypoplasia gene	CHH	5
Caspase1	CASP1	6
Caspase 10	CASP10	6
Caspase 2	CASP2	6
Caspase 3	CASP3	6
Caspase 4	CASP4	6
Caspase 5	CASP5	6
Caspase 6	CASP6	6
Caspase 7	CASP7	6
Caspase 8	CASP8	6
Caspase 9	CASP9	6
Catenin, beta	CTNNB1	6
CD1	CD1	4
CD10	CD10	4
CD4	CD4	4
CEA		6

Cell adhesion molecule, intercellular, ICAM	ICAM1	6
Cell adhesion molecule, leukocyte-endothelial, LECAM (CD62)	LECAM1	6
Cell adhesion molecule, liver, LCAM	LCAM	6
Cell adhesion molecule, neural, NCAM1	NCAM1	6
Cell adhesion molecule, neural, NCAM2	NCAM2	6
Cell adhesion molecule, platelet-endothelial, PECAM	PECAM1	6
Cell adhesion molecule, vascular, VCAM	VCAM1	6
c-erbB1	ERBB1	6
c-erbB2	ERBB2	6
c-erbB3	ERBB3	6
c-erbB4	ERBB4	6
Ceruloplasmin precursor	CP	1
Chemokine receptor CXCR1	CXCR1	4
Chemokine receptor CXCR2	CXCR2	4
Cholecystokinin	CCK	5
Cholecystokinin B receptor	CCKBR	5
Ciliary neurotrophic factor (CNTF)	CNTF	6
Ciliary neurotrophic factor (CNTF) receptor	CNTR	6
c-kit receptor tyrosine kinase		6
Clathrin		2
Clusterin	CLU	6
Collagen IV alpha 4	COL4A4	3
Collagen IV alpha 5	COL4A5	3
Collagen IV alpha 6	COL4A6	3
Colony-stimulating factor 1	CSF1	6
Colony-stimulating factor 1 receptor	CSF1R	6
Colony-stimulating factor 2	CSF2	6
Colony-stimulating factor 2 alpha receptor	CSF2RA	6
Colony-stimulating factor 2 beta receptor	CSF2RB	6
Colony-stimulating factor 3	CSF3	6
Colony-stimulating factor 3 receptor	CSF3R	6
Complement component C1 inhibitor	C1NH	4
Complement component C1qa	CIQA	4
Complement component C1qb	CLQB	4
Complement component C1qg	CLQG	4
Complement component C1r	C1R	4
Complement component C1s	C1S	4
Complement component C2	C2	4
Complement component C3	C3	4
Complement component C4A	C4A	4
Complement component C4B	C4B	4
Complement component C5	C5	4
Complement component C6	C6	4
Complement component C7	C7	4
Complement component C8	C8B	4

Complement component C9	C9	1
Complex III		1
Core-binding factor, alpha I	CBFA1	6
Core-binding factor, alpha 2	CBFA2	6
Core-binding factor, beta	CBFB	6
Corticotrophin-releasing hormone	CRH	2
Corticotrophin-releasing hormone receptor	CRHR1	2
c-src tyrosine kinase	CSK	6
Cyclic AMP-dependent protein kinase	PKA	1
Cyclin A	CCNA	6
Cyclin B	CCNB	6
Cyclin C	CCNC	6
Cyclin D	CCND1	6
Cyclin E	CCNE	6
Cyclin F	CCNF	6
Cyclin-dependent kinase 1	CDK1	6
Cyclin-dependent kinase 10	CDKI 0	6
Cyclin-dependent kinase 2	CDK2	6
Cyclin-dependent kinase 3	CDK3	6
Cyclin-dependent kinase 4	CDK4	6
Cyclin-dependent kinase 5	CDK5	6
Cyclin-dependent kinase 6	CDK6	6
Cyclin-dependent kinase 7	CDK7	6
Cyclin-dependent kinase 8	CDK8	6
Cyclin-dependent kinase 9	CDK9	6
Cyclin-dependent kinase inhibitor 1A (P21, CIP1)	CDKN1A	6
Cyclin-dependent kinase inhibitor I B (P27, KIP1)	CDKN1B	6
Cyclin-dependent kinase inhibitor IC (P57, KIP2)	CDKN1C	6
Cyclin-dependent kinase inhibitor 2A (p 1 6)	CDKN2A	6
Cyclin-dependent kinase inhibitor 3	CDKN3	6
Cyclooxygenase I	COX1	1
Cyclooxygenase 2	COX2	1
CYP11A1	CYP11A1	1
CYP11B1	CYP11B1	1
CYP11B2	CYP11B2	1
CYP17	CYP17	1
CYP19	CYP19	1
CYP1A1	CYP1A1	1
CYP1A2	CYP1A2	1
CYP1B1	CYP1B1	1
CYP21	CYP21	1
GYP24	CYP24	1
CYP27	CYP27	1
CYP27B1	PDDR	1



CYP2A1	CYP2A1	1
CYP2A13	CYP2A13	1
CYP2A3	CYP2A3	1
CYP2A6V2	CYP2A6V2	1
CYP2A7	CYP2A7	1
CYP2B6	CYP2B6	1
CYP2C18	CYP2C18	1
CYP2C19	CYP2C19	1
CYP2C8	CYP2C8	1
CYP2C9	CYP2C9	1
CYP2D6	CYP2D6	1
CYP2E1	CYP2E1	1
CYP2F1	CYP2F1	1
CYP2J2	CYP2J2	1
CYP3A3	CYP3A3	1
CYP3A4	CYP3A4	1
CYP3A5	CYP3A5	1
CYP3A7	CYP3A7	1
CYP4A11	CYP4A11	1
CYP4B1	CYP4B1	1
CYP4F2	CYP4F2	1
CYP4F3	CYP4F3	1
GYP51	CYP51	1
CYP5A1	CYP5A1	1
CYP7A	CYP7A	1
CYP8	CYP8	1
Cystathionase	CTH	1
Cystathione beta synthase	CBS	1
Cystic fibrosis transmembrane conductance regulator, CFTR	CFTR	5
Cytidine deaminase	CDA	1
Cytidine-5-prime-triphosphate synthetase	CTPS	1
Cytochrome a		1
Cytochrome c		1
Cytochrome c oxidase, MTCO		1
Cytokine-suppressive antiinflammatory drug- binding protein 1	CSBP1	4
Cytokine-suppressive antiinflammatory drug- binding protein 2	CSBP2	4
Defender against cell death 1	DAD1	6
Deleted in colorectal carcinoma	DCC	6
Deleted in malignant brain tumours 1	DMBT1	6
Deoxycytidine kinase DCK		1
Deoxyuridine triphosphatase; dUTPase		1
Desert hedgehog, dhh		6
Dihydrofolate reductase	DHFR	1
Dihydrolipoyl dehydrogenase		1

Dihydropyrimidine dehydrogenase	DPYD	1
DM-Kinase	DMPK	1
DNA damage binding protein, DDB1	DDB1	3
DNA damage binding protein, DDB2	DDB2	3
DNA directed polymerase, alpha	POLA	1
DNA glycosylases		1
DNA helicases		1
DNA Ligase 1	LIG1	1
DNA methyltransferase	DNMT	1
DNA polymerase 1		1
DNA polymerase 2		1
DNA polymerase 3		1
DNA primase		1
DNA-damage-inducible transcript 3	DDIT3	3
DNA-dependant RNA polymerase		1
DOPA decarboxylase	DDC	1
Dopamine receptors D1	DRD1	5
Dopamine receptors D2	DRD2	5
Dopamine receptors D3	DRD3	5
Dopamine receptors D4	DRD4	5
Dopamine receptors D5	DRD5	5
Dynamin	DNM1	6
Dynorphin receptor		5
Dysfedlin	DYS,DYSF	1
Dyskerin	DKC1	3
EB1		6
Endoglin	ENG	3
Endothelin 1	EDN1	5
Endothelin 2	EDN2	5
Endothelin 3	EDN3	5
Endothelin converting enzyme	ECE	5
Endothelin receptor type A	EDNRA	5
Endothelin receptor type B	EDNRB	5
Enolase	EN01	1
Ephrin receptor tyrosine kinase A	EPHA	6
Ephrin receptor tyrosine kinase B	EPHB	6
Epidermal growth factor	EGF	6
Epidermal growth factor receptor	EGFR	6
Estrogen receptor	ESR	6
Eukaryotic initiation translation factor	EIF4E	6
EWS RNA-binding protein	EWSR1	6
Excision repair complementation group 1 protein	ERCCI	1
Excision repair complementation group 2 protein	ERCC2	1
Excision repair complementation group 2 protein	ERCC3	1

Excision repair complementation group 4 protein	ERCC4	1
Excision repair complementation group 6 protein	ERCC6	1
Exostosin 1	EXT1	3
Exostosin 2	EXT2	3
FADH dehydrogenase		1
Fanconi anemia, complementation group C	FANCC	2
Fanconi anemia, complementation group D	FANCD	2
Fc fragment of IgG, high affinity IA, receptor for	FCGRL A	6
Fc fragment of IgG, low affinity IIa, receptor for (CD32)	FCGR2A	6
Fc fragment of IgG, low affinity IIIa, receptor for (CD16)	FCGR3A	6
Ferrochelatase	FECH	1
Fibrillin 1	FBN1	6
Fibroblast growth factor	FGF1	6
Fibroblast growth factor receptor 1	FGFR1	6
Fibroblast growth factor receptor 2	FGFR2	6
Fibroblast growth factor receptor 3	FGFR3	6
Fibronectin precursor	FN1	6
Folic acid receptor	FOLR	6
Follicle stimulating hormone receptor	FSHR,ODG1	6
Follicle stimulating hormone, FSH	FSHB	6
Follicular lymphoma variant translocation 1	FVT1	4
Forkhead rhabdomyosarcoma gene	FKHR	6
Forkhead transcription factor 14	FKHL14	6
Forkhead transcription factor 7	FKHL7	6
Fucosyltransferase 2	FUT2	2
Fucosyltransferase 3	FUT3	2
GIT mismatch binding protein	GTBP,MSH6	6
GABA receptor, alpha 1	GABRA1	5
GABA receptor, alpha 2	GABRA2	5
GABA receptor, alpha 3	GABRA3	5
GABA receptor, alpha 4	GABRA4	5
GABA receptor, alpha 5	GABRA5	5
GABA receptor, alpha 6	GABRA6	5
GABA receptor, beta 1	GABRB1	5
GABA receptor, beta 2	GABRB2	5
GABA receptor, beta 3	GABRB3	5
GABA receptor, gamma 1	GABRG1	5
GABA receptor, gamma 2	GABRG2	5
GABA receptor, gamma 3	GABRG3	5
Gadd45 (growth arrest & DNA-damage-inducible protein)		1
Galactosyltransferase 1	GT1	6
Galactosyltransferase, alpha 1,3	GGTA1	6
Galactosyltransferase, beta 3	B3GALT	6

Gastrin	GAS	6
Gastrin releasing peptide	GRP	2
Glioma chloride ion channel, GCC		6
Glucagon receptor	GCGR	6
Glucagon synthase		2
Glucocorticoid receptor	GRL	6
Glutamate receptor 1	GLUR1	5
Glutamate receptor 2	GLUR2	5
Glutamate receptor 3	GLUR3	5
Glutamate receptor 4	GLUR4	5
Glutamate receptor 5	GLUR5	5
Glutamate receptor 6	GLUR6	5
Glutamate receptor 7	GLUR7	5
Glutamate receptor, ionotropic, NMDA 1	NMDAR1	5
Glutamate receptor, ionotropic, NMDA 2A	NMDAR2A	5
Glutamate receptor, ionotropic, NMDA 2B	NMDAR2B	5
Glutamate receptor, ionotropic, NMDA 2C	NMDAR2C	5
Glutamate receptor, ionotropic, NMDA 2D	NMDAR2D	5
Glutathione	GSH	2
Glutathione S-transferase mu 1, GSTM1	GSTM1	1
Glutathione S-transferase theta 1, GSTT1	GSTT1	1
Glutathione S-transferase, GSTZ1	GSTZ1	1
Glyceraldehyde-3-phosphate dehydrogenase, GAPDH		1
GAPDH		
Glycerol kinase	GK	1
Glycinamide ribonucleotide (GAR)	GART	1
transformylase		
Glycine receptor, alpha	GLRA2	5
Glycine receptor, beta		5
Glycine transporter	GLYT	5
Glypican 3	GPC3, SDYS	6
Gonadotropin releasing hormone	GNRH	6
Gonadotropin releasing hormone receptor	GNRHR	6
Growth factor receptor-bound protein 2	GRB2	6
Growth hormone 1	GH1	6
Growth hormone 2 (placental)	GH2	6
Growth hormone receptor	GHR	6
Growth hormone releasing hormone (GHRH)	GHRH	6
Growth hormone releasing hormone receptor	GHRHR	6
Growth/differentiation factor 5	GDF5	6
Growth-regulated protein precursor, GRO	GRO	4
GTPase-activating protein, GAP	RASA1	6
Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 1, GNAI1	GNAI1	5
Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 2, GNAI2	GNAI2	5

Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 3, GNA13	GNAI3	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS1	GNAS1	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS2	GNAS2	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS3	GNAS3	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS4	GNAS4	5
Guanine nucleotide-binding protein, q polypeptide	GNAQ	5
Guanylate kinase		1
H(+), K(+) - ATPase	ATP4B	5
Hairless	HR	6
Hela tumor suppression gene	HTS1	6
Heparin binding epidermal growth factor	HBEGF	6
Hepatitis 8 virus integration site 1	HVBS1	4
Hepatitis B virus integration site 2	HVBS6	4
High mobility group protein C	HMGIC	6
High mobility group protein Y	HMGY	6
Histamine receptors, H1		5
Histamine receptors, H2		5
Histamine receptors, H3		5
HLH transcription factor HAND1	HAND1	6
HLH transcription factor HAND2	HAND2	6
HMG-CoA reductase	HMGCR	1
HMG-CoA synthase	HMGCS2	1
Homeobox (HOX) gene A13	HOXA13	6
Homeobox 11	HOX11	6
Homeobox HB24	HLX1	6
Homogentisate 1,2 dioxygenase	HGD	1
Hormone-sensitive lipase	HSL	1
HSSB, replication protein		1
Human placental lactogen	CSH1	6
bonucleoside diphosphate reductase		1
Ikaros gene	IKAROS	6
Inhibin, alpha	INHA	6
Inhibin, beta A	INHBA	6
Inhibin, beta B	INHBB	6
Inhibin, beta C	INHBC	6
Inositol 1,4,5-triphosphate receptor 3	ITPR3	6
Insulin	INS	6
Insulin receptor	INSR	6
Insulin-like growth factor 1	IGF1	6
Insulin-like growth factor 1 receptor	IGF1R	6
Insulin-like growth factor 2	IGF2	6

Insulin-like growth factor 2 receptor	IGF2R	6
Integrin beta 1	ITGB1	6
Integrin beta 2	ITGB2	6
Integrin beta 3	ITGB3	6
Integrin beta 4	ITGB4	6
Integrin beta 5	ITGB5	6
Integrin beta 6	ITGB6	6
Integrin beta 7	ITGB7	6
Integrin, alpha 1	ITGA1	6
Integrin, alpha 2	ITGA2	6
Integrin, alpha 4	ITGA4	6
Integrin, alpha 5	ITGA5	6
Integrin, alpha 6	ITGA6	6
Integrin, alpha M	ITGAM	6
Interferon alpha	IFNA1	4
Interferon beta	IFNB	4
Interferon gamma	IFNG	4
Interferon gamma receptor 1	IFNGR1	4
Interferon gamma receptor 2	IFNGR2	4
Interferon regulatory factor 1	IRF1	4
Interferon regulatory factor 4	IRF4	4
Interleukin(IL) I receptor	ILIR	4
Interleukin(IL) 1, alpha	IL1A	4
Interleukin(IL) 1, beta	IL1B	4
Interleukin(IL) 10	IL10	4
Interleukin(IL) 10 receptor	IL10R	4
Interleukin(IL) I I	IL11	4
Interleukin(IL) 11 receptor	IL11R	4
Interleukin(IL) 12	IL12	4
Interleukin(IL) 12 receptor, beta I	IL12RB1	4
Interleukin(IL) 13	IL13	4
Interleukin(IL) 13 receptor	IL13R	4
Interleukin(IL) 2	IL2	4
Interleukin(IL) 2 receptor, alpha	IL2RA	4
Interleukin(IL) 2 receptor, gamma	IL2RG	4
Interleukin(IL) 3	IL3	4
Interleukin(IL) 3 receptor	IL3R	4
Interleukin(IL) 4	IL4	4
Interleukin(IL) 4 receptor	IL4R	4
Interleukin(IL) 5	IL5	4
Interleukin(IL) 5 receptor	IL5R	4
Interleukin(IL) 6	IL6	4
Interleukin(IL) 6 receptor	IL6R	4
Interleukin(IL) 7	IL7	4
Interleukin(IL) 7 receptor	IL7R	4
Interleukin(IL) 8	IL8	4
Interleukin(IL) 8 receptor	IL8R	4

Interleukin(IL) 9	IL9	4
Interleukin(IL) 9 receptor	IL9R	4
Interleukin(IL) receptor antagonist I	IL1RN, IL1RA	4
Janus kinase 1	JAK1	6
Janus kinase 2	JAK2	6
Janus kinase 3	JAK3	6
Laminin 5, alpha 3	LAMA3	6
Laminin 5, beta 3	LAMB3	6
Laminin 5, gamma 2	LAMC2	6
Laminin M	LAMM	6
Laminin receptor 1	LAMR1	6
Latent transforming growth factor-beta binding protein 2	LTBP2	6
Leptin	LEP	6
Leptin receptor	LEPR	6
Leukaemia inhibitory factor	LIF	6
Leukaemia inhibitory factor receptor	LIFR	6
Leukotriene A4 hydrolase		4
Leukotriene B4 receptor		4
Leukotriene C4 receptor		4
Leukotriene D4/E4 receptor		4
LH/choriogonadotropin (CG) receptor	LHCGR	6
LIM homeobox protein 1	LHX1	6
LIM. homeobox protein 2	LHX2	6
LIM homeobox protein 3	LHX3	6
LIM homeobox protein 4	LHX4	6
Limbic associated membrane protein	LAMP	6
LIM-domain only protein 1	LMO1	6
LIM-domain only protein 2	LMO2	6
LIM-domain only protein 3	LMO3	6
LIM-domain only protein 4	LMO4	6
Lipoma-preferred partner gene	LPP	6
Lipoxygenase 12 (platelets)	LOG12	4
Lipoxygenase 5 (leukocytes)		4
Long QT-type 2 potassium channels	LQT2, KCNH2	2
Lowe oculocerbrorenal syndrome gene	OCRL	1
Luteinizing hormone-releasing hormone		5
Luteinizing hormone-releasing hormone receptor		5
Lymphoblastic leukemia derived sequence 1	LYL1	4
Lymphocyte-specific protein tyrosine kinase	LCK	4
Lymphoid enhancer-binding factor	LEF-1	6
Macrophage activating factor	MAF	4
MAD (mothers against decapentaplegic, Drosophila) homologue 3	MADH3	6
MAD (mothers against decapentaplegic, Drosophila) homologue 4	MADH4	6

MADS box transcription-enhancer factor 2A	MEF2A	6
MADS box transcription-enhancer factor 2B	MEF2B	6
MADS box transcription-enhancer factor 2C	MEF2C	6
MADS box transcnption-enhancer factor 2D	MEF2D	6
Malignant proliferation, eosinophil gene	MPE	4
MAPK kinase 1	MAPKK1; MEK1	6
MAPK kinase 4	MAPKK4; MEK4;	6
SERK1		
MAPK kinase 6	MAPKK6; MEK6	6
MAPKK kinase	MAPKKK	6
MAX-interacting protein 1	MXI 1	6
MEK kinase, MEKK		1
Melanocortin 1 receptor	MCI R	2
Menin	MEN1	6
Methionine adenosyltransferase	MAT1 A, MAT2A	1
Methionine synthase	MTR	1
Methionine synthase reductase	MTRR	1
Methylguanine-DNA methyltransferase	MGMT	1
MHC Class 1: A		4
MHC Class 1: B		4
MHC Class 1: C		4
MHC Class 1: LMP-2, LMP-7		4
MHC Class 1: Tap1	ABCR,TAP1	4
MHC Class 11: DP	HLA-DPBL	4
MHC Class II: DQ		4
MHC Class II: DR		4
MHC Class II: Tap2	TAP2,PSF2	4
MHC Class II:Complementation group A	MHC2TA	4
MHC Class II:Complementation group B	rfxank	4
MHC Class II:Complementation group C	RFX5	4
MHC Class II:Complementation group D	RFXAP	4
Midline 1	MIDI	6
Mismatch,repair gene, PMSL1	PMS1	6
Mismatch repair gene, PMSL2	PMS2	6
Mitogen-activated protein (MAP) kinase	MAPK	6
Motilin	MLN	6
Msh homeobox homolog 1	MSX1	6
Msh homeobox homolog 2	MSX2	6
Mucin 18	MUC18	2
Muscarinic receptor, M1	CHRM1	5
Muscarinic receptor, M2	CHRM2	5
Muscarinic receptor, M3	CHRM3	5
Muscarinic receptor, M4	CHRM4	5
Muscarinic receptor, M5	CHRM5	5
Mutated in colorectal cancers, MCC	MCC	6
MutL homolog 1	MLHI	6
MutS homolog 2	MSH2	6



MutS homolog 3	MSH3	6
Myelin protein peripheral 22	PMP22	3
Myelodysplasia syndrome 1 gene	MDS1	6
Myeloid leukemia factor-1	MLF1	4
N-acetyltransferase 1	NAT1	1
N-acetyltransferase 2	NAT2	1
reductase		
Nerve growth factor	NGF	6
Nerve growth factor receptor	NGFR	6
Neuregulin	HGL	6
Neurexin		5
Neurofibromin 1	NF1	6
Neurofibromin 2	NF2	6
Neurokinin A	NKNA	5
Neurokinin B	NKNB	5
Neuronal apoptosis inhibitory protein	NAIP	4
Neuropeptide Y	NPY	5
Neuropeptide Y receptor Y1	NPY1R	5
Neuropeptide Y receptor Y2	NPY2R	5
Neurotensin	NTS	5
Neurotensin receptor	NTSR1	5
Neurotrophic tyrosine kinase receptor 1	NTRK1	6
Neutral endopeptidase		1
Niacin receptor		6
Nodal	NODAL	6
Norrie disease protein	NDP	6
Notch 3	NOTCH3	6
Notch ligand - jagged 1	JAG 1, AGS	6
Nuclear factor kappa beta	NFKB	4
Nuclear factor of activated T cells (NFAT)	NFATC	6
complex, cytosolic		
Nuclear factor of activated T cells (NFAT)	NFATP	6
complex, preexisting component		
Nuclear mitotic apparatus protein 1	NUMA1	6
Nucleophosmin	NPM1	2
Oligophrenin-1	OPHN1	6
Oncogene abl1	ABLI	6
Oncogene abl2		6
Oncogene akt1		6
Oncogene akt2	AKT2	6
Oncogene axl	AXL	6
Oncogene bcl2		6
Oncogene bcr/abi		6
Oncogene B-lym		6
Oncogene B-raf		6
Oncogene clkl		6
Oncogene c-myc		6

Oncogene cot		6
Oncogene crk		6
Oncogene crkl		6
Oncogene ect2		6
Oncogene ELK1	ELK1	6
Oncogene ELK2	ELK2	6
Oncogene ems1		6
Oncogene ERB		6
Oncogene ERB2		6
Oncogene ERBA		6
Oncogene ERBAL2		6
Oncogene ERG (early reponse gene)		6
Oncogene ETSI		6
Oncogene ETS2		6
Oncogene EVI1	EVI1	6
Oncogene fes		6
Oncogene fgr		6
Oncogene fos	FOS	6
Oncogene fps		6
Oncogene GLI1	GLI	6
Oncogene GLI2	GLI2	6
Oncogene GLI3	GLI3	6
Oncogene gro1		6
Oncogene gro2		6
Oncogene Ha-ras	HRAS	6
Oncogene hs1		6
Oncogene hst	FGF4	6
Oncogene int1	WNT1	6
Oncogenein	FGF3	6
Oncogene int3	Notch4	6
Oncogene int4	WNT3	6
Oncogenejun	JUN	6
Oncogene KIT	KIT, PBT	6
Oncogene LCO	LCO	6
Oncogene I-myc		6
Oncogene Ipsa		6
Oncogene lyn		6
Oncogene maf		6
Oncogene mas1		6
Oncogene mcf2		6
Oncogene mdm2	MDM2	6
Oncogene mel		6
Oncogene met	MET	6
Oncogene mos		6
Oncogene mpl		6
Oncogene MUM1	MUM1	6
Oncogene myb	MYB	6

Oncogene myc	MYC	6
Oncogene n-myc		6
Oncogene N-ras (neuroblastoma v-ras)	NRAS	6
Oncogene ovc		6
Oncogene pim1		6
Oncogene pti-1 sea		6
Oncogene pvt1		6
Oncogene raf	RAF	6
Oncogene ralb		6
Oncogene rel		6
Oncogene ret	RET	6
Oncogene r-myc		6
Oncogene ros		6
Oncogene R-ras		6
Oncogene sis	PDGFB	6
Oncogene ski		6
Oncogene sno		6
Oncogene spi1		6
Oncogene src		6
Oncogene tc21		6
Oncogene TEL	ETV6	6
Oncogene tim		6
Oncogene vavtrk		6
Oncogene v-Ki-ras2	KRAS2	6
Oncogene yes		6
Oncogene yuasa		6
Oncostatin M	OSM	6
Oncostatin M receptor	OSMR	6
Opioid receptor, delta	OPRD1	5
Opioid receptor, kappa	OPRK1	5
Opioid receptor, mu	OPRM1	5
Orexin	OX	6
Osteopontin	OPN	6
Oxytocin	OXT	5
Oxytocin receptor	OXTR	5
Paired box homeotic gene 3	PAX3	6
Paired box homeotic gene 6	PAX6	6
Paired box homeotic gene 7	PAX7	6
Paired-like homeodomain transcription factor 2	PITX2	6
Paired-like homeodomain transcription factor 3	PITX3	6
Parathyroid hormone	PTH	6
Parathyroid hormone receptor	PTHRI	6
Parathyroid hormone related-peptide	PTHRP	6
Parvalbumin	PVALB	6
Patched (Drosophila) homolog, PTCH	PTCH	6
PCNA (proliferating cell nuclear antigen)		1
Peanut-like 1	PNUTL1	4

Peroxisome proliferative activated receptor, alpha	PPARA	2
Peroxisome proliferative activated receptor, gamma	PPARG	2
P-glycoprotein 1	PGY1	2
P-glycoprotein 3	PGY3	2
Phenylalanine hydroxylase	PAH	1
Phosphatase & tensin homolog	PTEN	6
Phosphatidylinositol glycan, class A (paroxysmal nocturnal hemoglobinuria)	PIGA	6
Phospholipase A2, group 10	PLA2G10	4
Phospholipase A2, group 1B	PLA2G1B	4
Phospholipase A2, group 2A	PLA2G2A	4
Phospholipase A2, group 2B	PLA2G2B	4
Phospholipase A2, group 4A	PLA2G4A	4
Phospholipase A2, group 4C	PLA2G4C	4
Phospholipase A2, group 5	PLA2G5	4
Phospholipase A2, group 6	PLA2G6	4
Phospholipase C epsilon		4
Phosphomannomutase 1	PMM1	6
Phosphomannomutase 2	PMM2	6
Plasminogen	PLG	1
Plasminogen activator inhibitor 1	PAI1	1
Plasminogen activator inhibitor 2	PAI2	1
Plasminogen activator receptor, Urokinase	UPAR;PLAUR	3
Plasminogen activator, Tissue	PLAT;TPA	1
Plasminogen activator, Urokinase	UPA;PLAU	1
Platelet derived growth factor	PDGF	6
Platelet derived growth factor receptor	PDGFR	6
Platelet glycoprotein 1b, beta	GP1BB	4
Platelet glycoprotein I b, gamma	GP1BG	4
Platelet glycoprotein IX	GP9	4
Platelet glycoprotein V	GP5	4
Potassium inwardly-rectifying channel J1	KCNJ1	5
Potassium inwardly-rectifying channel J11	KCNJ11	5
Potassium voltage-gated channel A1	KCNA1	5
Potassium voltage-gated channel E1	KCNE1	5
Potassium voltage-gated channel Q1	KCNQ1	5
Potassium voltage-gated channel Q2	KCNQ2	5
Potassium voltage-gated channel Q3	KCNQ3	5
POU domain, class 1, transcription factor 1 (Pit1)	POU1F1	6
POU domain, class 3, transcription factor 4	POU3F4	6
POU domain, class 4, transcription factor 3	POU4F3	6
Pre-B-cell leukemia transcription factor 1	PBXL	6
Preproglucagon	GCG;GLPL; GLP2	6
Preproglucagon		2

Prion protein	PRNP	5
Prodynorphin		5
Prohibitin	PHB	6
Prolactin	PRL	6
Prolactin receptor	PRLR	6
Prolactin releasing hormone	PRH	6
Proliferin	PLF	6
Promyelocytic-leukemia gene	PML	6
Proopiomelanocortin	POMC	5
Prophet of Pit1	PROP1	6
Prostacyclin synthase		4
Prostaglandin 15-OH dehydrogenase	HGPD; PGDH	4
Prostaglandin D - DP receptor		4
Prostaglandin E1 receptor		4
Prostaglandin E2 receptor		4
Prostaglandin E3 receptor		4
Prostaglandin F - FP receptor		4
Prostaglandin IP receptor		4
Prostate cancer anti-metastasis gene KAI I	KAI 1	6
Protein kinase B	PRKB	
Protein kinase C, alpha	PRKCA	1
Protein phosphatase 2, regulatory subunit A, beta isoform	PPP2R1B	1
Protein tyrosine phosphatase, non-receptor type 12	PTPN12	6
Purine nucleoside phosphorylase	NP	1
Purinergic receptor P1A1		5
Purinergic receptor P1A2		5
Purinergic receptor P1A3		5
Purinergic receptor P2X, 1	P2RX1	1
Purinergic receptor P2X, 2	P2RX2	5
Purinergic receptor P2X, 3	P2RX3	5
Purinergic receptor P2X, 4	P2RX4	5
Pudnergic receptor P2X, 5	P2RX5	5
Purinergic receptor P2X, 6	P2RX6	5
Purinergic receptor P2X, 7	P2RX7	5
Purinergic receptor P2Y, 1	P2RY1	5
Purinergic receptor P2Y, 11	P2RY11	5
Purinergic receptor P2Y, 2	P2RY2	5
Rabphilin		5
RAD51, DNA repair protein	RAD51	6
RAD52, DNA repair protein	RAD52	6
RAD54, DNA repair protein	RAD54	6
RAD55, DNA repair protein	RAD55	6
RAD57, DNA repair protein	RAD57	6
RAS-associated protein, RAB3A	RAB3A	5
Ras-G-protein	RAS	6

Receptor tyrosine kinase (RTK), Nsk2	NSK2	6
Relaxin H1	RLN1	6
Relaxin H2	RLN2	6
Replication factor A		1
Replication factor C	RFC2	1
Retinoblastoma 1	RB1	6
Retinoic acid receptor, alpha	RARA	6
Retinoic acid receptor, beta	RARB	6
Retinoic acid receptor, gamma	RARG	6
Retinoschisis, X-linked, juvenile	RS	6
Rhabdoid tumors	SMARCSI	6
Ribonucleotide reductase, RRM		1
Ribosomal protein L13A	RPL13A	6
Ribosomal protein L17	RPL17	6
Ribosomal protein S6 kinase	RPS6KA3	1
RIGUI	RIGUI	6
Rim		5
Ryanodine receptor 1, skeletal	RYR1	6
S-adenosylmethionine decarboxylase, AMD		1
SAP (SLAM-associated protein)	SH2D1A	4
Secretin	SCT	2
Secretin receptor, SCTR	SCTR	2
Serine hydroxymethyltransferase	SHMT	1
Serine/threonine kinase 11	STK11	6
Serine/threonine kinase 2	STK2	6
Serotonin receptor, 5HT1A	HTR1A	5
Serotonin receptor, 5HT1B	HTR1B	5
Serotonin receptor, 5HT1C	HTR1C	5
Serotonin receptor, 5HT1D	HTR1D	5
Serotonin receptor, 5HT1E	HTR1E	5
Serotonin receptor, 5HT1F	HTR1F	5
Serotonin receptor, 5HT2A	HTR2A	5
Serotonin receptor, 5HT2B	HTR2B	5
Serotonin receptor, 5HT2C	HTR2C	5
Serotonin receptor, 5HT3	HTR3	5
Serotonin receptor, 5HT4	HTR4	5
Serotonin receptor, 5HT5	HTR5	5
Serotonin receptor, 5HT6	HTR6	5
Serotonin receptor, 5HT7	HTR7	5
Signal transducer and activator of transcription 1	STAT1	6
Signal transducer and activator of transcription 2	STAT2	6
Signal transducer and activator of transcription 3	STAT3	6
Signal transducer and activator of transcription 4	STAT4	6

Signal transducer and activator of transcription 5	STAT5	6
Signaling lymphocyte activation molecule	SLAM	4
Sine oculis homeobox, drosophila, homolog 1	SIX1	6
Sine oculis homeobox, drosophila, homolog 2	SIX2	6
Sine oculis homeobox, drosophila, homolog 5	SIX5	6
Small nuclear ribonucleoprotein polypeptide N	SNRPN	3
Smoothed (Drosophila) homolog	SMOH	6
Sodium channel, non-voltage gated 1, alpha	SCNN1A	5
Sodium channel, non-voltage gated 1, beta	SCNN1B	5
Sodium channel, non-voltage gated 1, gamma	SCNN1G	5
Sodium channel, voltage gated, type V, alpha polypeptide	SCN5A	5
Sodium channel, voltage-gated, type 1, beta polypeptide	SCN1B	5
Solute carrier family 1 (glutamate transporter), member 1	SLC1A1	2
Solute carrier family 1 (glutamate transporter), member 2	SLC1A2	2
Solute carrier family 12, member 1	SLC12A1	2
Solute carrier family 12, member 2	SLC12A2	2
Solute carrier family 12, member 3	SLC12A3	2
Solute carrier family 19 (folate transporter), member 1	SLC19A1	2
Solute carrier family 25, member 12	SLC25A12	2
Solute carrier family 5 (sodium/glucose transporter), member 1	SLC5A1	2
Solute carrier family 5 (sodium/glucose transporter), member 2	SLC5A2	2
Solute carrier family 5 (sodium/glucose transporter), member 5	SLC5A5	2
Solute carrier family 5, member 3	SLC5A3	2
Solute carrier family 6 (GAMMA-AMINOBUTYRIC ACID transporter), member 1	SLC6A1	2
Solute carrier family 6 (neurotransmitter transporter, dopamine), member 3	SLC6A3	2
Solute carrier family 6 (neurotransmitter transporter, noradrenaline), member 2	SLC6A2	2
Solute carrier family 6 (neurotransmitter transporter, serotonin), member 4	SLC6A4	2
Somatostatin	SST	5
Somatostatin receptor, SSTR1	SSTR1	5
Somatostatin receptor, SSTR2	SSTR2	6
Somatostatin receptor, SSTR3	SSTR3	5
Somatostatin receptor, SSTR4	SSTR4	5
Somatostatin receptor, SSTR5	SSTR5	5
Sorcin	SRI	2

SOSI guanine nucleotide exchange factor	SOS1	6
SRY-box 11	SOX11	6
Stem cell factor	SCF	6
Steroid hormone receptor responsive DNA elements		6
Steroidogenic acute regulatory protein	STAR	2
Substance P		5
Sulfonylurea receptor	SUR	6
Suppression of tumorigenicity 3 gene	ST3	6
Suppression of tumorigenicity 8 gene	ST8	6
Surfeit 1	SURF1	6
Synapsin I a & Ib	SYN1	5
Synapsin 2a & 2b	SYN2	5
Synaptic vesicle protein 2	SV2	5
Synaptobrevin 1	SyB1	5
Synaptobrevin 2	SYB2	5
Synaptogyrin		5
Synaptophysin	SYP	5
Synaptosomal-associated protein, 25KD	SNAP25	5
Synaptotagmin 1	SYT1	5
Synaptotagmin 2	SYT2	5
Syndecan 1	SYND1	6
Syndecan 2	SYND2	6
Syndecan 3	SYND3	6
Syndecan 4	SYND4	6
Synovial sarcoma gene 1	SSX1	6
Synovial sarcoma gene 2	SSX2	6
Syntaxin 1	STX1	5
Tachykinin receptor, NK1R	TACR1	5
Tachykinin receptor, NK2R	TACR2	5
Tachykinin receptor, NK3R	TACR3	5
Talin	TLN	6
Talin, TLN		3
T-cell acute lymphocytic leukemia 1	TAL1	4
T-cell acute lymphocytic leukemia 2	TAL2	4
T-cell receptor, alpha	TCRA	4
T-cell receptor, delta	TCRD	4
Telomerase protein component		1
Tenascin (cytotactin)		3
Tenascin XA	TNXA	3
Terminal deoxynucleotidyltransferase, TDT		1
Testis-specific protein Y	TSPY	6
Thrombopoietin	THPO	6
Thromboxane A synthase 1	TBXAS1	4
Thromboxane A2	TXA2	4
Thromboxane A2 receptor	TBXA2R	4
Thy-1 T-cell antigen	THY1	4



Thymidylate synthase	TYMS	1
Thymopoietin	TMPO	6
Thymosin		4
Thyroid-stimulating hormone receptor	TSHR	6
Thyroid-stimulating hormone, alpha	TSHA	6
Thyroid-stimulating hormone, beta	TSHB	6
Thyrotropin releasing hormone	TRH	5
Thyrotropin releasing hormone	TRH	6
Thyrotropin releasing hormone receptor	TRHR	5
Tip-associated protein	TAP	4
Tissue inhibitor of metalloproteinase 1, TIMP1	TIMP1	1
Tissue inhibitor of metalloproteinase 2, TIMP2	TIMP2	1
Tissue inhibitor of metalloproteinase 3, TIMP3	TIMP3	1
Tissueinhibitorofmetalloproteinase4,TIMP4	TIMP4	1
Topoisomerase II		1
Transacylase		1
Transcobalamin 1, TCN1		2
Transcobalamin 2, TCN2	TCN2	2
Transcription factor 1, hepatic	TCF1	6
Transcription factor 2, hepatic	TCF2	6
Transcription factor 3	TCF3	6
Transcription factor binding to IGHM enhancer 3	TFE3	6
Transcription termination factor, RNA polymerase 1	TTF1	6
Transcription termination factor, RNA polymerase 2	TTF2	6
Transcription termination factor, RNA polymerase 3	TTF3	6
Transferrin	TF	6
Transferrin receptor	TFRC	6
Transforming growth factor, alpha	TGFA	6
Transforming growth factor, beta 2	TGFB2	6
Transforming growth factor, beta induced	TGFBI	6
Transforming growth factor, beta receptor 2	TGFBR2	6
Translocation in renal carcinoma on chromosome 8 gene	TRC8	6
Tuberous sclerosis 1	TSC1	6
Tuberous sclerosis 2	TSC2	6
Tubulin		3
Tumor susceptibility gene 101	TSG101	6
Tumour necrosis factor (TNF) receptor associated factor 1	TRAF1	4
Tumour necrosis factor (TNF) receptor associated factor 2	TRAF2	4
Tumour necrosis factor (TNF) receptor associated factor 3	TRAF3	4

Tumour necrosis factor (TNF) receptor associated factor 4	TRAF4	4
Tumour necrosis factor (TNF) receptor associated factor 5	TRAF5	4
Tumour necrosis factor (TNF) receptor associated factor 6	TRAF6	4
Tumour necrosis factor alpha	TNFA	4
Tumour necrosis factor alpha receptor	TNFAR	4
Tumour necrosis factor beta	TNFB	4
Tumour necrosis factor beta receptor	TNFBR	4
Tumour protein p53	TP53,P53	6
Tumour protein p63	TP63	6
Tumour protein p73	TP73	6
Tumour protein, translationally-controlled 1	TPT1	6
Tumour suppressor gene DRA	DRA	4
Twist (Drosophila) homolog	TWIST	6
Ubiquitin		6
Ubiquitin activating enzyme, E1		1
Ubiquitin B	UBB	6
Ubiquitin C	UBC	6
Ubiquitin fusion degeneration 1 -like	UFD1L	6
Ubiquitin protein ligase E3A	UBE3A	1
Vacuolar proton pump, subunit 1	VPP1	5
Vacuolar proton pump, subunit 3	VPP3	5
Vasoactive intestinal polypeptide	VIP	5
Vasoactive intestinal polypeptide receptor	VIPR	5
Vitamin B12-binding (R) protein		6
Vitamin D receptor	VDR	6
v-myc avian myelocytomatosis viral oncogene homolog	MYC	6
Von Hippel-Lindau gene	VHL	6
Werner syndrome helicase	WRN	6
Wilms tumour gene 1	VVT I	6
Wilms tumour gene 2	WT2	6
Wilms tumour gene 4	WT4	6
Winged helix nude	WHN	6
Wiskott-Aldrich syndrome protein	WASP, THC	4
Xeroderma pigmentosum, complementation group B	XPB	1
Xeroderma pigmentosum, complementation group C	XPC	1
Xeroderma pigmentosum, complementation group D		1
Xeroderma pigmentosum, complementation group E		1
Xeroderma pigmentosum, complementation group F	XPF	1

Xeroderma pigmentosum, complementation group G	ERCC5	1
X-ray repair gene	XRCC9	6
YY1 transcription factor	YY1	6
Zinc finger protein HRX	ALL1	4,

Legende für die Spalte Proteinfunktion:

1	Enzym	2	Transport und Lagerung
3	Struktur	4	Immunität
5	Nervale Transmission	6	Wachstum und Differenzierung

**Tabelle 3**  
**CNS-Fehlfunktion**

<b>Liste der Gene</b>	<b>HUGO Gensymbol</b>	<b>Protein- funktion</b>
11-beta hydroxysteroid dehydrogenase 2	HSD11B2	1
2,3-bisphosphoglycerate mutase	BPGM	1
2,4-dienoyl CoA reductase	DECR	1
3 beta hydroxysteroid dehydrogenase 2	HSD3B2	1
3-oxoacid CoA transferase	OXCT	1
4-hydroxyphenylpyruvate dioxygenase	HPD	1
5,10-methylenetetrahydrofolate reductase (NADPH)	MTHFR	1
6-pyruvoyltetrahydropterin synthase	PTS	1
Acetoacetyl 2-CoA-thiolase	ACAT2	1
Acetyl CoA acyltransferase	ACAA	1
Acetyl CoA carboxylase alpha	ACACA	1
Acetylcholine receptor, nicotinic, alpha A1	CHRNA1	5
Acetylcholine receptor, nicotinic, alpha A2	CHRNA2	5
Acetylcholine receptor, nicotinic, alpha A3	CHRNA3	5
Acetylcholine receptor, nicotinic, alpha A4	CHRNA4	5
Acetylcholine receptor, nicotinic, alpha A5	CHRNA5	5
Acetylcholine receptor, nicotinic, alpha A6	CHRNA6	5
Acetylcholine receptor, nicotinic, alpha A7	CHRNA7	5
Acetylcholine receptor, nicotinic, beta 1	CHRNA1	5
Acetylcholine receptor, nicotinic, beta 2	CHRNA2	5
Acetylcholine receptor, nicotinic, beta 3	CHRNA3	5
Acetylcholine receptor, nicotinic, beta 4	CHRNA4	5
Acetylcholine receptor, nicotinic, epsilon	CHRNA5	5
Acetylcholine receptor, nicotinic, gamma	CHRNA6	5
Acetylcholinesterase	ACHE	1
Acyl CoA dehydrogenase, long chain	ACADL	1
Acyl CoA dehydrogenase, medium chain	ACADM	1
Acyl CoA dehydrogenase, short chain	ACADS	1
Acyl-CoA thioesterase		1
Adaptin, beta 3A	ADTB3A	2
Adducin, alpha	ADD1	3
Adducin, beta	ADD2	3
Adenosine monophosphate deaminase	AMPD	1
Adenosine receptor A1	ADORA1	5
Adenosine receptor A2A	ADORA2A	5
Adenosine receptor A2B	ADORA2B	5
Adenosine receptor A3	ADORA3	5
Adenyl cyclase		5
Adenylate cyclase I	ADCY1	1

Adenylate cyclase 2	ADCY2	1
Adenylate cyclase 3	ADCY3	1
Adenylate cyclase 4	ADCY4	1
Adenylate cyclase 5	ADCY5	1
Adenylate cyclase 6	ADCY6	1
Adenylate cyclase 7	ADCY7	1
Adenylate cyclase 8	ADCY8	1
Adenylate cyclase 9	ADCY9	1
Adenylosuccinate lyase	ADSL	1
Adrenergic receptor, alpha1	ADRAL	5
Adrenergic receptor, alpha2	ADRA2	5
Adrenergic receptor, beta1	ADRB1	5
Adrenergic receptor, beta2	ADRB2	5
Adrenergic receptor, beta3	ADRB3	5
Adrenocorticotrophic hormone (ACTH) receptor	ACTHR	6
Adrenoleukodystrophy gene	ALD	1
Albumin, ALB	ALB	2
Aldehyde dehydrogenase 10	ALDH10	1
Aldolase A	ALDOA	1
Aldolase B	ALDOB	1
Aldolase C	ALDOC	1
Aldosterone receptor	MLR	6
Alpha 2 macroglobulin	A2M	4
alpha tectorin	TECTA	6
alpha thalassemia gene	ATRX	5
alpha1-antitrypsin	PI	1
alpha2-antiplasmin	PLI	1
alpha-Galactosidase A	GLA	1
alpha-ketoglutarate dehydrogenase		1
alpha-L-Iduronidase	IDUA	1
alpha-synuclein	SNCA	5
Aminomethyltransferase	AMT	1
Aminopeptidase P	XPNPEP2	1
Amylo-1,6-glucosidase	AGL	1
Amyloid beta (A4) precursor protein-binding, APBB1	APBB1	5
Amyloid beta A4 precursor protein	APP	5
Amyloid beta A4 precursor-like protein	APLP	5
Angiopoietin 1	ANGPT1	6
Angiopoietin 2	ANGPT2	6
Angiotensin converting enzyme	ACE, DCP1	1
Angiotensin receptor 1	AGTR1	2
Angiotensin receptor 2	AGTR2	2
Angiotensinogen	AGT	1
Antidiuretic hormone receptor	ADHR	2
Antithrombin III	AT3	1

Apolipoprotein A I	APOA1	2
Apolipoprotein A 11	APOA2	2
Apolipoprotein B	APOB	2
Apolipoprotein C1	APOC1	2
Apolipoprotein C2	APOC2	2
Apolipoprotein C3	APOC3	2
Apolipoprotein D	APOD	2
Apolipoprotein E	APOE	2
Apolipoprotein H	APOH	2
Archaeete-scute homolog 2	ASH2	6
Arginase	ARG1	1
Arginine vasopressin	AVP	5
Arginosuccinate lyase	ASL	1
Arginosuccinate synthetase	ASS	1
Arylsulfatase A	ARSA	1
Arylsulfatase B	ARSB	1
Arylsulfatase D	ARSD	1
Arylsulfatase E	ARSE	1
Arylsulfatase F	ARSF	1
Aspaftoacylase	ASPA	1
Aspartylglucosaminidase	AGA	1
Astrotactin	ASTN	6
Ataxia telangiectasia complementation group D	ATD,ATDC	6
Ataxia telangiectasia gene, AT	ATM	6
ATP-binding cassette transporter 7	ABC7	4
Atrial natriuretic peptide	ANP	6
Atrial natriuretic peptide receptor A	NPR1	6
Atrial natriuretic peptide receptor B	NPR2	6
Atrial natriuretic peptide receptor C	NPR3	6
Bagpipe homeobox, drosophila homolog of, 1	BAPX1	6
beta-Glucuronidase	GUSB	1
beta-synuclein	SNCB	5
Bilirubin UDP-glucuronosyltransferase		1
Bloom syndrome protein	BLM	6
Bradykinin receptor B1		
Bradykinin receptor B2		
Brain derived neurotrophic factor	BDNF	6
Brain derived neurotrophic factor (BDNF) receptor	BDNFR	6
Butyrylcholinesterase	BCHE	1
Ca(2+) transporting ATPase, slow twitch	ATP2A2	2
Cadherin E	CDH1	6
Cadherin EP		6
Cadherin N	CDH2	6
Cadherin P	CDH3	6
Calbindin 1	CALB1	6

Calbindin D9K	CALB3	6
Calcineurin A1	CALNA1	
Calcineurin A2	CALNA2	
Calcineurin A3	CALNA3	
Calcineurin B		
Calcitonin/Calcitonin gene-related peptide alpha	CALCA	5
Calcium channel, voltage-dependent, alpha 1 F subunit	CACNA1F	5
Calcium channel, voltage-dependent, Alpha- 1 B (CACNLI A5)	CACNA1B	5
Calcium channel, voltage-dependent, Alpha- I C	CACNA1C	5
Calcium channel, voltage-dependent, Alpha- 1 D	CACNA1D	5
Calcium channel, voltage-dependent, Alpha- I E (CACNLL A6)	CACNA1E	5
Calcium channel, voltage-dependent, Alpha- 2/delta	CACNA2	5
Calcium channel, voltage-dependent, Beta 1	CACNB1	5
Calcium channel, voltage-dependent, Beta 3	CACNB3	5
Calcium channel, voltage-dependent, L type, alpha 1S subunit	CACNA1S	5
Calcium channel, voltage-dependent, Neuronal, Gamma	CACNG2	5
Calcium channel, voltage-dependent, P/Q type, alpha 1 A subunit	CACNA1A	5
Calcium channel, voltage-dependent, T-type		5
Calmodulin 1	CALM1	6
Calmodulin 2	CALM2	6
Calmodulin 3	CALM3	6
Calmodulin-dependant protein kinase 11	CAMK2A	6
Calnexin	CANX	6
Calpain	CAPN,CAPN3	1
Calretinin	CALB2	5
Cannabinoid receptor	CNR1	5
Carbonic anhydrase 3	CA3	1
Carbonic anhydrase 4	CA4	1
Carbonic anhydrase, alpha	CA1	1
Carbonic anhydrase, beta	CA2	1
Cardiac-specific homeobox, CSX	CSX	6
Carnitine acetyltransferase	CRAT	1
Camitine acyicamitine translocase	CACT	1
Camitine transporter protein	CDSP, SCD	2
Carnosinase		5
Caspase1	CASP1	6
Catechol-o-methyltransferase	COMT	1

CD1	CD1	
CD4	CD4	
Cell adhesion molecule, neural, NCAM1	NCAM1	6
Cell adhesion molecule, neural, NCAM120	NCAM120	6
Cell adhesion molecule, neural, NCAM2	NCAM2	6
Ceroid lipofuscinosis neuronal 2	CLN2	5
Ceroid lipofuscinosis neuronal 3	CLN3	5
Ceroid lipofuscinosis neuronal 4	CLN4	5
Ceroid lipofuscinosis neuronal 5	CLN5	5
Ceroid lipofuscinosis neuronal 6	CLN6	5
Chemokine receptor CCR2	CCR2	
Chemokine receptor CCR3	CCR3	
Chemokine receptor CCR5	CCR5	4
Chemokine receptor CXCR4	CXCR4	4
Chloride channel 1, skeletal muscle	CLCN1	3
Cholecystokinin	CCK	5
Cholecystokinin B receptor	CCKBR	5
Choline acetyltransferase	CHAT	1
Choroideremia gene	CHM	3
Chromogranin A	CHGA	6
Chymotrypsinogen		1
Ciliary neurotrophic factor (CNTF)	CNTF	6
Ciliary neurotrophic factor (CNTF) receptor	CNTR	6
Clathrin		2
CoA transferase		1
Cochlin	COCH	4
Cockayne syndrome gene, CKN1	CKN1	6
Cofilin		3
Collagen I alpha 1	COL1A1	3
Collagen I alpha 2	COL1A2	3
Collagen II alpha 1	COL2A1	3
Collagen III alpha 1	COL3A1	3
Collagen IV alpha 1	COL4A1	3
Collagen IV alpha 2	COL4A2	3
Collagen IV alpha 3	COL4A3	3
Collagen IV alpha 4	COL4A4	3
Collagen IV alpha 5	COL4A5	3
Collagen IV alpha 6	COL4A6	3
Collagen IX alpha 2	COL9A2, EDM2	3
Collagen IX alpha 3	COL9A3	3
Collagen receptor	COLR	3
Collagen V alpha 1	COL5A1	3
Collagen V alpha 2	COL5A2	3
Collagen VI alpha 1	COL6A1	3
Collagen VI alpha 2	COL6A2	3
Collagen VI alpha 3	COL6A3	3
Collagen VII alpha 1	COL7A1	3



Collagen X alpha 1	COL10A1	3
Collagen X alpha 1	COL11A1	3
Collagen XI alpha 2	COL1A2	3
Collagen XVII alpha 1	COL17A1	3
Coliagenic-like tall subunit of asymmetric acetylcholinesterase	COLQ	1
Colony-stimulating factor 1	CSF1	6
Colony-stimulating factor 1 receptor	CSF1R	6
Colony-stimulating factor 2	CSF2	6
Colony-stimulating factor 2 alpha receptor	CSF2RA	6
Colony-stimulating factor 2 beta receptor	CSF2RB	6
Complex V	MTATP6	1
Cone-rod homeobox-containing gene	CRX	6
Contactin	CNTN1	6
Corticotrophin-releasing hormone	CRH	2
Corticotrophin-releasing hormone receptor	CRHR1	2
Creb binding protein	CREBBP	6
Cu <sup>2+</sup> transporting ATPase beta polypeptide	ATP7B	1
Cyclic AMP response element binding protein	CREB	6
Cyclic AMP-dependent protein kinase	PKA	1
Cyclic nucleotide gated channel alpha 1, CNGA1	CNGAL	5
Cyclic nucleotide gated channel alpha 3, CNGA3	CNGA3	5
Cyclic nucleotide phosphodiesterase 1B	PDE1B	1
Cyclic nucleotide phosphodiesterase 1B1	PDE1B1	1
Cyclic nucleotide phosphodiesterase 2A3	PDE2A3	1
Cyclic nucleotide phosphodiesterase 3A	PDE3A	1
Cyclic nucleotide phosphodiesterase 3B	PDE3B	1
Cyclic nucleotide phosphodiesterase 4A	PDE4A	1
Cyclic nucleotide phosphodiesterase 4C	PDE4C	1
Cyclic nucleotide phosphodiesterase 5A	PDE5A	1
Cyclic nucleotide phosphodiesterase 6A	PDE6A	1
Cyclic nucleotide phosphodiesterase 6B	PDE6B	1
Cyclic nucleotide phosphodiesterase 7	PDE7	1
Cyclic nucleotide phosphodiesterase 8	PDE8	1
Cyclic nucleotide phosphodiesterase 9A	PDE9A	1
Cyclin-dependent kinase 2	CDK2	6
Cyclooxygenase 1	COX1	1
Cyclooxygenase 2	COX2	1
CYP11A1	CYPL1A1	1
CYP11B1	CYP11B1	1
CYP11B2	CYP11B2	1
CYP17	CYP17	1
CYP19	CYP19	1
CYP1A1	CYP1A1	1
CYP1A2	CYP1A2	1

CYP1B1	CYP1B1	1
CYP21	CYP21	1
CYP24	CYP24	1
CYP27	CYP27	1
CYP27B1	PDDR	1
CYP2A1	CYP2A1	1
CYP2A33	CYP2A13	1
CYP2A3	CYP2A3	1
CYP2A6V2	CYP2A6V2	1
CYP2A7	CYP2A7	1
CYP2B6	CYP2B6	1
CYP2C18	CYP2C18	1
CYP2C19	CYP2C19	1
CYP2C8	CYP2C8	1
CYP2C9	CYP2C9	1
CYP2D6	CYP2D6	1
CYP2E1	CYP2E1	1
CYP2F1	CYP2F1	1
CYP2J2	CYP2J2	1
CYP3A3	CYP3A3	1
CYP3A4	CYP3A4	1
CYP3A5	CYP3A5	1
CYP3A7	CYP3A7	1
CYP4A11	CYP4A11	1
CYP4B1	CYP4B1	1
CYP4F2	CYP4F2	1
CYP4F3	CYP4F3	1
CYP51	CYP51	1
CYP5A1	CYP5A1	1
CYP7A	CYP7A	1
CYP8	CYP8	1
Cystathionase	CTH	1
Cystathione beta synthase	CBS	1
Cystatin B	CSTB	2
Cystatin C	CST3	2
Cystinosin	CTNS	2
Cytidine deaminase	CDA	1
Cytidine-5-prime-triphosphate synthetase	CTPS	1
Cytochrome a		1
Cytochrome c		1
Cytochrome c oxidase, MTCO		1
Cytokine-suppressive antiinflammatory drug-binding protein 1	CSBP1	4
Cytokine-suppressive antiinflammatory drug-binding protein 2	CSBP2	4
DAX1 nuclear receptor	DAX1	4
Deafness autosomal dominant 5	DFNA5	5

Deafness dystonia peptide	DDP	5
Deleted in malignant brain tumours 1	DMBT1	6
Delta aminolevulinate dehydratase	ALAD	1
Delta-7-dehydrocholesterol reductase	DHCR7	1
DHEA sulfotransferase	STD	1
Diaphanous 1	DIAPH1	5
Diaphanous 2	DIAPH2	5
Dihydrolipoamide branched chain transacylase	DBT	5
Dihydrolipoamide dehydrogenase	DLD	5
Dihydrolipoyl dehydrogenase 2	PDHA	1
Dihydrolipoyl transacetylase	PDHA	1
Dihydroxyacetonephosphate acyltransferase	DHAPAT	1
DNA glycosylases		1
DNA helicases		1
DNA Ligase I	LIG1	1
DNA methyltransferase	DNMT	1
DOPA decarboxylase	DDC	1
Dopamine beta hydroxylase	DBH	1
Dopamine receptors D1	DRD1	5
Dopamine receptors D2	DRD2	5
Dopamine receptors D3	DRD3	5
Dopamine receptors D4	DRD4	5
Dopamine receptors D5	DRD5	5
Doublecortin, DCX	DCX	3
Dynamin	DNM1	6
Dystonia 1	DYT1	3
Dystonia 3	DYT3	3
Dystonia 6	DYT6	3
Dystonia 7	DYT7	3
Dystonia 9	CSE	3
Dystrophia myotonica	DM, DMPK	1
Dystrophia myotonica, atypical	DM2	1
Dystrophin	DMD	3
Ectodermal Dysplasia 1 gene	ED1	3
Electron-transferring-flavoprotein alpha	ETFA	2
Electron-transferring-flavoprotein beta	ETFB	2
Electron-transferring flavoprotein dehydrogenase	ETFDH	1
Emerin	EMD	2
Empty spiracles (drosophila) homologue 1	EMX1	6
Empty spiracles (drosophila) homologue 2	EMX2	6
Endobrevin	VAMP8	5
Endothelin 1	EDN1	5
Endothelin 2	EDN2	5
Endothelin 3	EDN3	5
Endothelin converting enzyme	ECE1	5

Endothelin receptor type A	EDNRA	5
Endothelin receptor type B	EDNRB	5
Enolase	ENO1	1
Enoyl CoA isomerase		1
Enoyl CoA reductase		1
Enterokinase	PRSS7, ENTK	1
Ephrin-A	EFNA	6
Ephrin-B	EFNB	6
Epidermal growth factor	EGF	6
Epidermal growth factor receptor	EGFR	6
Epilepsy, progressive myoclonic 2 gene	EPM2A	1
EWS RNA-binding protein	EWSR1	6
Excision repair complementation group 4 protein	ERCC4	1
Exostosin 1	EXT1	3
Exostosin 2	EXT2	3
Factor I (No. one)	F1	4
Factor III	F3	4
Factor IX	F9	4
Factor V	F5	4
Factor VII	F7	4
Factor VIII	F8	4
Factor X	F10	4
Factor XI	F11	4
Factor Xii	F12	4
Factor XIII A & B	F13A & F13B	4
Fanconi anemia, complementation group A	FANCA	2
Fanconi anemia, complementation group C	FANCC	2
Fanconi anemia, complementation group D	FANCD	2
Fibrillin 2	FBN2	6
Fibrinogen alpha	FGA	3
Fibrinogen beta	FGB	3
Fibrinogen gamma	FGG	3
Fibroblast growth factor	FGF1	6
Fibroblast growth factor receptor 1	FGFR1	6
Fibroblast growth factor receptor 2	FGFR2	6
Fibroblast growth factor receptor 3	FGFR3	6
Fibronectin precursor	FN1	6
Flightless-11, Drosophila homolog of	FLII	6
Follicle stimulating hormone receptor	FSHR,ODG1	6
Fol icle stimulating hormone, FSH	FSHB	6
Forkhead transcription factor IO	FKHL10	6
Formiminotransferase		1
Fragile site, folic acid type, rare, fra(X) A	FRAXA	5
Fragile site, folic acid type, rare, fra(X) E	FRAXE	5
Fragile site, folic acid type, rare, fra(X) F	FRAXF	5
Frataxin	FRDA	6

Fructose-1,6-diphosphatase	FBP1	1
Fukuyama type congenital muscular dystrophy	FCMD	6
GABA receptor, alpha 1	GABRAL	5
GABA receptor, alpha 2	GABRA2	5
GABA receptor, alpha 3	GABRA3	5
GABA receptor, alpha 4	GABRA4	5
GABA receptor, alpha 5	GABRA5	5
GABA receptor, alpha 6	GABRA6	5
GABA receptor, beta 1	GABRB1	5
GABA receptor, beta 2	GABRB2	5
GABA receptor, beta 3	GABRB3	5
GABA receptor, gamma 1	GABRG1	5
GABA receptor, gamma 2	GABRG2	5
GABA receptor, gamma 3	GABRG3	5
GABA transaminase	ABAT	1
Galactocerebrosidase	GALC	1
Galactose 1-phosphate uridylyl-transferase	GALT	1
Galactosyltransferase 1	GT1	6
Galactosyltransferase, alpha 1,3	GGTAL	6
Galactosyltransferase, beta 3	B3GALT	6
Galanin	GAL	5
Galanin receptor	GALNRL	5
Gamma-glutamyltransferase 1	GGTI	2
Gap junction protein beta 2	GJB2	2
Gap junction protein beta 3	GJB3	2
Gastric Intrinsic factor, GIF	GIF	1
Gastrulation brain homeobox 2	GBX2	6
Geniospasm I	GSM1	6
Gephyrin		5
Glial-cell derived neurotrophic factor (GDNF) receptor		5
Glial-cell derived neurotrophic factor, GDNF	GDNF	5
Glucosidase, acid alpha	GAA	1
Glutamate decarboxylase, GAD	GAD1	1
Glutamate dehydrogenase	GLUD1	1
Glutamate receptor 1	GLUR1	5
Glutamate receptor 2	GLUR2	5
Glutamate receptor 3	GLUR3	5
Glutamate receptor 4	GLUR4	5
Glutamate receptor 5	GLUR5	5
Glutamate receptor 6	GLUR6	5
Glutamate receptor 7	GLUR7	5
Glutamate receptor, ionotropic, NMDA 1	NMDAR1	5
Glutamate receptor, ionotropic, NMDA 2A	NMDAR2A	5
Glutamate receptor, ionotropic, NMDA 2B	NMDAR2B	5
Glutamate receptor, ionotropic, NMDA 2C	NMDAR2C	5

Glutamate receptor, ionotropic, NMDA 2D	NMDAR2D	5
Glutamate-cysteine ligase	GLCLC	1
Glutaryl-CoA dehydrogenase	GCDH	1
Glutathione	GSH	2
Glutathione S-transferase, GSTZ1	GSTZI	1
Glutathione synthetase	GSS	1
Glyceraldehyde-3-phosphate dehydrogenase, GAPDH	GAPDH	1
Glycerol kinase	GK	1
Glycinamide ribonucleotide (GAR) transformylase	GART	1
Glycine dehydrogenase	GLDC	1
Glycine receptor, alpha	GLRA2	5
Glycine receptor, beta		5
Glycine transporter	GLYT	5
Glycogen phosphorylase	PYGL	1
GM2 ganglioside activator protein, GM2A	GM2A	1
Gonadotropin releasing hormone receptor	GNRHR	6
GTP cyclohydrolase 1	GCH1	6
Guanidinoacetate N-methyltransferase	GAMT	1
Guanine nucleotide-binding protein, alpha activating activity polypeptide, GNAO	GNA01	5
Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 1, GNAI1	GNAI1	5
Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 2, GNAI2	GNAI2	5
Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 3, GNAI3	GNAI3	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS1	GNAS1	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS2	GNAS2	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS3	GNAS3	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS4	GNAS4	5
Guanine nucleotide-binding protein, alpha transducing activity polypeptide, GNAT1	GNAT1	5
Guanine nucleotide-binding protein, alpha transducing activity polypeptide, GNAT2	GNAT2	5
Guanine nucleotide-binding protein, beta polypeptide 3	GNB3	5
Guanine nucleotide-binding protein, gamma polypeptide 5	GNG5	5
Guanine nucleotide-binding protein, q polypeptide	GNAQ	5

Guanylate cyclase 2D, membrane (retina-specific)	GUCY2D	1
Guanylate cyclase activator 1A (retina)	GUCA1A	1
Guanylate kinase		1
Guanylyl cyclase		1
Gustducin, alpha (taste-specific G protein)	GDCA	5
Haeme regulated inhibitor kinase		1
Haemoglobin alpha 1	HBA1	2
Haemoglobin alpha 2	HBA2	2
Haemoglobin beta	HBB	2
Haemoglobin delta	HBD	2
Haemoglobin gamma A	HBG1	2
Haemoglobin gamma B	HBG2	2
Haemoglobin gamma G	HBGG	2
Heat shock protein, HSP60		4
Heat shock protein, HSP70		4
Heat shock protein, HSP90		4
Heat shock protein, HSPAL		4
Heat shock protein, HSPA2		4
Heparan sulfamidase		1
Heparin binding epidermal growth factor	HBEGF	6
Heparin Cofactor II	HCF2	4
Hepatic lipase	LIPC	1
Hexosaminidase A	HEXA,TSD	1
Hexosaminidase B	HEXB	1
Hippocampal cholinergic neurostimulating peptide, HCNP		5
Histamine receptors, H1		5
Histamine receptors, H2		5
Histamine receptors, H3		5
Histidase		1
HLA-B associated transcript 1	BAT1	4
HLH transcription factor HAND1	HAND1	6
HLH transcription factor HAND2	HAND2	6
HMG-CoA lyase	HMGCL	1
HMG-CoA reductase	HMGCR	1
Holocarboxylase synthetase	HLCS	1
Homeobox HB9	HLXB9	6
Human atonal gene	ATOH1	6
Hypoxanthine-guanine phosphoribosyltransferase, HGPRT	HPRT	1
Hypoxia inducible factor 1	HIF1A	1
Hypoxia inducible factor 2		1
IC7 A and B		
Inositol 1,4,5-triphosphate receptor I	ITPR1	6
Inositol monophosphatase	IMPA1	5
Inositol polyphosphate 1-phosphatase	INPP1	5
Insulin	INS	6

Insulin receptor	INSR	6
Insulin-like growth factor 1	IGF1	6
Insulin-like growth factor 1 receptor	IGF1R	6
Insulin-like growth factor 2	IGF2	6
Insulin-like growth factor 2 receptor	IGF2R	6
Integrin beta 1	ITGB1	6
Integrin beta 2	ITGB2	6
Integrin beta 3	ITGB3	6
Integrin, alpha 1	ITGA1	6
Integrin, alpha M	ITGAM	6
Inter-alpha-trypsin inhibitor, IATI		1
Interleukin(IL) 1 receptor	IL1 R	4
Interleukin(IL) 1, alpha	IL1A	4
Interleukin(IL) 1, beta	IL1B	4
Interleukin(IL) 10	IL10	4
Interleukin(IL) 10 receptor	IL10R	4
Interleukin(IL) 11	IL11	4
Interleukin(IL) 11 receptor	IL11R	4
Interleukin(IL) 12	IL12	4
Interleukin(IL) 12 receptor, beta 1	IL12RB1	4
Interleukin(IL) 13	IL13	4
Interleukin(IL) 13 receptor	IL13R	4
Interleukin(IL) 2	IL2	4
Interleukin(IL) 2 receptor, alpha	IL2RA	4
Interleukin(IL) 2 receptor, gamma	IL2RG	4
Interleukin(IL) 3	IL3	4
Interleukin(IL) 3 receptor	IL3R	4
Interleukin(IL) 4	IL4	4
Interleukin(IL) 4 receptor	IL4R	4
Interleukin(IL) 5	IL5	4
Interleukin(IL) 5 receptor	IL5R	4
Interleukin(IL) 6	IL6	4
Interleukin(IL) 6 receptor	IL6R	4
Interleukin(IL) 7	IL7	4
Interleukin(IL) 7 receptor	IL7R	4
Interleukin(IL) 8	IL8	4
Interleukin(IL) 8 receptor	IL8R	4
Interleukin(IL) 9	IL9	4
Interleukin(IL) 9 receptor	IL9R	4
Interleukin(IL) receptor antagonist 1	IL1RN, IL1RA	4
IP3 kinase		1
Isovaleric acid CoA dehydrogenase	IVD	1
Kallikrein 3	KAK3	4
Kallman syndrome gene 1	KAL1	6
Ketohexokinase	KHK	1
Kininogen, High molecular weight	KNG	4
Kynureninase		1



L1 cell adhesion molecule	L1CAM	5
Laminin 5, alpha 3	LAMA3	6
Laminin 5, beta 3	LAMB3	6
Laminin 5, gamma 2	LAMC2	6
Laminin M	LAMM	6
Laminin receptor I	LAMR1	6
Latent transforming growth factor-beta binding protein 2	LTBP2	6
Leptin	LEP	6
Leptin receptor	LEPR	6
Leukaemia inhibitory factor	LIF	6
Leukaemia inhibitory factor receptor	LIFR	6
Leukin		4
Leukocyte-specific transcript 1	LST-1	4
Leukotriene A4 hydrolase		4
Leukotriene A4 synthase	LTA4S	1
Leukotriene B4 receptor		4
Leukotriene B4 synthase	LTB4S	1
Leukotriene C4 receptor		4
Leukotriene C4 synthase	LTC4S	1
Leukotriene D4/E4 receptor		4
LIM homeobox protein 1	LHX1	6
LIM homeobox protein 2	LHX2	6
LIM homeobox protein 3	LHX3	6
LIM homeobox protein 4	LHX4	6
Limbic associated membrane protein	LAMP	6
LIM-domain only protein 1	LM01	6
LIM-domain only protein 2	LM02	6
LIM-domain only protein 3	LM03	6
LIM-domain only protein 4	LM04	6
LIM-Kinase I (LINK-I)		4
Lipoprotein receptor, Low Density	LDLR	2
Lipoprotein, High Density	HDLDT1	2
Lipoprotein, Intermediate Density		2
Lipoprotein, Low Density 1		2
Lipoprotein, Low Density 2		2
Lipoprotein, Very Low Density	VLDLR	2
Low density lipoprotein receptor-related protein precursor	LRP	2
Lymphoid enhancer-binding factor	LEF-1	6
MAD (mothers against decapentaplegic, Drosophila) homologue 4	MADH4	6
Malonyl CoA decarboxylase		1
Mannosidase, alpha B lysosomal	MANB	1
Mannosidase, beta A lysosomal	MANBA	1
Marenostrin	MEFV	2
Melatonin receptor 1A	MTNRLA	5

Melatonin receptor 1 B	MTNRLB	5
Methylguanine-DNA methyltransferase	MGMT	1
Methylmalonyl-CoA mutase	MUT	1
Mevalonate kinase	MVK	1
Microsomal triglyceride transfer protein	MTP	2
Microtubule associated protein	MAP	3
Mismatch repair gene, PMSL2	PMS2	6
Molybdenum cofactor synthesis 1	MOCS1	1
Molybdenum cofactor synthesis 2	MOCS2	1
Monoamine oxidase A	MAOA	1
Monoamine oxidase B	MAOB	1
Msh homeobox homolog 2	MSX2	6
Mucopolidoses	GNPTA	1
Muscarinic receptor, M1	CHRM1	5
Muscarinic receptor, M2	CHRM2	5
Muscarinic receptor, M3	CHRM3	5
Muscarinic receptor, M4	CHRM4	5
Muscarinic receptor, M5	CHRM5	5
Myelin protein peripheral 22	PMP22	3
Myelin protein zero	MPZ	3
Myogenic factor 3	MYF3	6
Myogenic factor 4	MYF4	6
Myogenic factor 5	MYF5	6
Myosin 6	MYO6	3
Myosin 7A	MYO7A	3
Myotubularin	MTMI	3
Na <sup>+</sup> , K <sup>+</sup> ATPase, alpha	ATP1A1	6
Na <sup>+</sup> , K <sup>+</sup> ATPase, beta 1	ATP1B1	6
Na <sup>+</sup> , K <sup>+</sup> ATPase, beta 2	ATP1B2	6
Na <sup>+</sup> , K <sup>+</sup> ATPase, beta 3	ATP1B3	6
N-acetylglucosamine-6-sulfatase	GNS	1
N-acetylglucosaminidase, alpha	NAGLU	1
NADH dehydrogenase reductase		1
NB6		4
Nebulin	NEB	3
Necdin	NDN	6
Nerve growth factor	NGF	6
Nerve growth factor receptor	NGFR	6
Neural retina-specific gene	NRL	6
Neuraminidase sialidase	NEU	2
Neuregulin	HGL	6
Neurite growth-promoting factor 2	MDK	5
Neurite inhibitory protein		5
Neuroendocrine convertase 1	NEC1, PCSKI	1
Neurofibromin I	NF1	6
Neurofibromin 2	NF2	6

Neurofilament protein, heavy	NFH	3
Neurofilament protein, NF68	NF68	3
Neurokinin A	NKNA	5
Neurokinin B	NKNB	5
Neuronal apoptosis inhibitory protein	NAIP	4
Neuronal molecule-1		4
Neuronal molecule-1 receptor		4
Neuropeptide Y	NPY	5
Neuropeptide Y receptor Y1	NPY1R	5
Neuropeptide Y receptor Y2	NPY2R	5
Neurotensin	NTS	5
Neurotensin receptor	NTSR1	5
Neutral endopeptidase		1
Niemann-Pick disease protein	NPC1	2
Nitric oxide synthase 1, NOS1	NOS1	1
Nitric oxide synthase 2, NOS2	NOS2	1
Nitric oxide synthase 3, NOS3	NOS3	1
Notch 1	NOTCH1	6
Notch 2	NOTCH2	6
Notch 3	NOTCH3	6
Notch ligand - jagged 1	JAG 1, AGS	6
Nuclear factor I-kappa-B-like gene	IKBL	4
Nucleoside diphosphate kinase-A	NDPKA	1
Oncogene bcl2		6
Oncogene GLI 1	GLI	6
Oncogene GLI2	GLI2	6
Oncogene GLI3	GLI3	6
Oncogene sis	PDGFB	6
Opioid receptor, delta	OPRD1	5
Opioid receptor, kappa	OPRK1	5
Opioid receptor, mu	OPRM1	5
Ornithine delta-aminotransferase	OAT	1
Ornithine transcarbamoylase	OTC, NME1	1
Orthodenticle (Drosophila) homolog 1	OTX1	6
Orthodenticle (Drosophila) homolog 2	OTX2	6
Otoferrin	OTOF	5
Paired box homeotic gene 2	PAX2	6
Paired box homeotic gene 3	PAX3	6
Palmitoyl-protein thioesterase	PPT	2
Parkin	PARK2	5
Patched (Drosophila) homolog, PTCH	PTCH	6
Peanut-like 1	PNUTLL	4
Peptidylglycine alpha-amidating monooxygenase	PAM	1
Peripherin, PRPH		3
Peroxisomal membrane protein 1	PXMP1	3
Peroxisomal membrane protein 3	PXMP3	2

Peroxisome biogenesis factor 1	PEX1	2
Peroxisome biogenesis factor 19	PEX19	2
Peroxisome biogenesis factor 6	PEX6	2
Peroxisome biogenesis factor 7	PEX7	2
Peroxisome receptor 1	PXR1	2
Persyn		3
Phosphate regulating gene with homologies to endopeptidases on the X chromosome	PHEX	6
Phosphatidylinositol transfer protein	PITPN	6
Phosphoglucose isomerase	GPI	1
Phosphoglycerate kinase I	PGKL	1
Phospholipase A2, group 10	PLA2G10	4
Phospholipase A2, group 1B	PLA2G1B	4
Phospholipase A2, group 2A	PLA2G2A	4
Phospholipase A2, group 2B	PLA2G2B	4
Phospholipase A2, group 4A	PLA2G4A	4
Phospholipase A2, group 4C	PLA2G4C	4
Phospholipase A2, group 5	PLA2G5	4
Phospholipase A2, group 6	PLA2G6	4
Phospholipase C alpha		4
Phospholipase C beta		4
Phospholipase C delta	PLCD1	4
Phospholipase C epsilon		4
Phospholipase C gamma	PLCG1	4
Phosphomannomutase 2	PMM2	6
Phosphoribogyl pyrophosphate synthetase	PRPS1	1
Phytanoyl-CoA hydroxylase	PHYH	6
Plakophilin 1	PKP1	2
Plasminogen	PLG	1
Plasminogen activator inhibitor 1	PAI1	1
Plasminogen activator inhibitor 2	PAI2	1
Plasminogen activator receptor, Urokinase	UPAR, PLAUR	3
Plasminogen activator, Tissue	PLAT, TPA	1
Plasminogen activator, Urokinase	UPA, PLAU	1
Platelet derived growth factor	PDGF	6
Platelet derived growth factor receptor	PDGFR	6
Platelet-activating factor receptor	PAFR	4
Plectin 1	PLEC1	2
Postsynaptic density-95 protein	PSD95	5
Potassium channel, calcium-activated	KCNN4	5
Potassium channel, subfamily K, member 1	KCNK1	5
Potassium channel, subfamily K, member 2	KCNK2	5
Potassium channel, subfamily K, member 3	KCNK3	5
Potassium inwardly-rectifying channel J 1	KCNJ1	5
Potassium voltage-gated channel A1	KCNA1	5
Potassium voltage-gated channel E1	KCNE1	5
Potassium voltage-gated channel Q1	KCNQ1	5

Potassium voltage-gated channel Q2	KCNQ2	5
Potassium voltage-gated channel Q3	KCNQ3	5
Potassium voltage-gated channel Q4	KCNQ4	5
POU domain, class 1, transcription factor 1 (Pit1)	POU1F1	6
POU domain, class 3, transcription factor 4	POU3F4	6
POU domain, class 4, transcription factor 3	POU4F3	6
Prekallikrein		4
Preproenkephalin	PENK	5
Presenitin	PSEN1	2
Presenilin 2	PSEN2	2
Prion protein	PRNP	5
Procollagen N-protease		1
Proline dehydrogenase	PRODH	1
Pro-melanin-concentrating hormone	PMCH	6
Proopiomelanocortin	POMC	5
Prosaposin	PSAP	5
Prostacyclin synthase		4
Prostaglandin 15-OH dehydrogenase	HGPD, PGDH	4
Prostaglandin D - DP receptor		4
Prostaglandin E1 receptor		4
Prostaglandin E2 receptor		4
Prostaglandin E3 receptor		4
Prostaglandin F - FP receptor		4
Prostaglandin I2 receptor		2
Prostaglandin IP receptor		4
Protease nexin 2	PN2	1
Protective protein for beta-galactosidase	PPGB	1
Protein C	PROC	4
Protein C inhibitor	PCI	4
Protein kinase C, alpha	PRKCA	1
Protein kinase C, gamma	PRKCG	1
Protein kinase G		1
Protein phosphatase 1, regulatory (inhibitor) subunit 3	PPP1R3	1
Protein S	PROS1	
Prothrombin precursor	F2	
Purine nucleoside phosphorylase	NP	1
Pyrroline-5-carboxylate synthetase	PYCS	1
Pyruvate carboxylase	PC	1
Pyruvate decarboxylase	PDHA	1
Ras-G-protein	RAS	6
Rathke pouch homeobox, RPX	RPX	6
Renin	REN	1
Replication factor C	RFC2	1
Retinal pigment epithelium specific protein (65kD)	RPP65	3

Retinaldehyde binding protein 1	RLBP1	2
Retinoblastoma 1	RB1	6
Rhodopsin kinase	RHOK	1
RIGUI	RIGUI	6
S100 calcium-binding protein A3	S I00A3	5
S100 calcium-binding protein A4	S100A4	5
S100 calcium-binding protein A5	S100A5	5
S100 calcium-binding protein A7	S100A7	5
S100 calcium-binding protein A8	S100A8	5
S100 calcium-binding protein A9	S100A9	5
S100 calcium-binding protein P	S100P	5
Secretase, alpha		5
Secretase, beta		5
Secretase, gamma		5
Selectin E	SELE	5
Selectin L	SELL	5
Selectin P	SELP	5
Semaphorin A4	SEMA4	3
Semaphorin A5	SEMA5	3
Semaphorin D		3
Semaphorin E	SEMAE	3
Semaphorin F	SEMA3/F	3
Semaphorin W	SEMAW	3
Serotonin N-acetyltransferase	SNAT	1
Serotonin receptor, 5HT1A	HTR1A	5
Serotonin receptor, 5HT1B	HTR1B	5
Serotonin receptor, 5HT1C	HTR1C	5
Serotonin receptor, 5HT1D	HTR1D	5
Serotonin receptor, 5HT1E	HTR1E	5
Serotonin receptor, 5HT1F	HTR1F	5
Serotonin receptor, 5HT2A	HTR2A	5
Serotonin receptor, 5HT2B	HTR2B	5
Serotonin receptor, 5HT2C	HTR2C	5
Serotonin receptor, 5HT3	HTR3	5
Serotonin receptor, 5HT4	HTR4	5
Serotonin receptor, 5HT5	HTR5	5
Serotonin receptor, 5HT6	HTR6	5
Serotonin receptor, 5HT7	HTR7	5
Signaling lymphocyte activation molecule	SLAM	4
Slug protein		6
Small nuclear ribonucleoprotein polypeptide SNRPN		3
N		
Sodium channel, non-voltage gated 1, alpha	SCNN1A	5
Sodium channel, non-voltage gated 1, beta	SCNN1B	5
Sodium channel, non-voltage gated 1, gamma	SCNN1G	5

Sodium channel, voltage gated, type IV, alpha polypeptide	SCN4A	5
Sodium channel, voltage-gated, type 1, beta polypeptide	SCN1B	5
Solute carrier family 1 (amino acid transporter), member 6	SLC1A6	2
Solute carrier family 1 (glial high affinity glutamate transporter), member 3	SLC1A3	2
Solute carrier family 1 (glutamate transporter), member 1	SLC1A1	2
Solute carrier family 1 (glutamate transporter), member 2	SLC1A2	2
Solute carrier family 12, member 1	SLC12A1	2
Solute carrier family 12, member 2	SLC12A2	2
Solute carrier family 12, member 3	SLC12A3	2
Solute carrier family 16 (monocarboxylate transporter), member 1	SLC16A1	2
Solute carrier family 16 (monocarboxylate transporter), member 7	SLC16A7	2
Solute carrier family 18, member 3	SLC18A3	2
Solute carrier family 2 (facilitated glucose transporter), member I	SLC2A1	2
Solute carrier family 20, member 3	SLC20A3	2
Solute carrier family 25, member 12	SLC25A12	2
Solute carrier family 4 (anion exchangers, member 1	SLC4A1	2
Solute carrier family 4 (anion exchanger), member 2	SLC4A2	2
Solute carrier family 4 (anion exchanger), member 3	SLC4A3	2
Solute carrier family 5 (sodium/glucose transporter), member I	SLC5A1	2
Solute carrier family 5 (sodium/glucose transporter), member 2	SLC5A2	2
Solute carrier family 5 (sodium/glucose transporter), member 5	SLC5A5	2
Solute carrier family 5, member 3	SLC5A3	2
Solute carrier family 6 (GAMMA-AMINOBUTYRIC ACID transporter), member 1	SLC6A1	2
Solute carrier family 6 (neurotransmitter transporter, dopamine), member 3	SLC6A3	2
Solute carrier family 6 (neurotransmitter transporter, noradrenaline), member 2	SLC6A2	2
Solute carrier family 6 (neurotransmitter transporter, serotonin), member 4	SLC6A4	2
Solute carrier family 6, member 6	SLC6A6	2

Solute carrier family 7(amino acid transporter), member 1	SLC7A1	2
Solute carrier family 7(amino acid transporter), member 2	SLC7A2	2
Solute carrier family 7(amino acid transporter), member 7	SLC7A7	2
Somatostatin	SST	5
Somatostatin receptor, SSTR1	SSTR1	5
Somatostatin receptor, SSTR2	SSTR2	6
Somatostatin receptor, SSTR3	SSTR3	5
Somatostatin receptor, SSTR4	SSTR4	5
Somatostatin receptor, SSTR5	SSTR5	5
Spastic paraplegia 7	SPG7	6
Spectrin beta	SPTB	3
Sphingomyelinase	SMPD1	1
Spinocerebellar ataxia 8 gene	SCA8	5
SRY-box 11	SOX11	6
Steroid 5 alpha reductase 1	SRD5A1	1
Steroid 5 alpha reductase 2	SRD5A2	1
Steroid sulphatase	STS	1
Substance P		5
Succinic semi-aldehyde dehydrogenase	SSADH	1
Sulfamidase	SGSH	6
Sulfite oxidase	SUOX	1
Superoxide dismutase 1	SOD1	1
Superoxide dismutase 3	SOD3	1
Surfeit 1	SURF1	6
Survival of motor neuron 1, telomeric	SMN1	2
Synapsin Ia & Ib	SYN1	5
Synapsin 2a & 2b	SYN2	5
Synaptic vesicle amine transporter	SVAT	5
Synaptic vesicle protein 2	SV2	5
Synaptobrevin 1	SYB1	5
Synaptobrevin 2	SYB2	5
Synaptogyrin		5
Synaptophysin	SYP	5
Synaptosomal-associated protein, 25KD	SNAP25	5
Synaptotagmin 1	SYT1	5
Synaptotagmin 2	SYT2	5
Syntaxin 1	STX1	5
Tachykinin receptor, NK1R	TACR1	5
Tachykinin receptor, NK2R	TACR2	5
Tachykinin receptor, NK3R	TACR3	5
Talin	TLN	6
Tau protein	MAPT	3
TEK, tyrosine kinase, endothelial	TEK	1
Telomerase protein component		1



Thiolase, peroxisomal		1
Thrombin receptor	F2R	4
Thrombopoietin	THPO	6
Thromboxane A synthase 1	TBXAS1	4
Thromboxane A2	TXA2	4
Thromboxane A2 receptor	TBXA2R	4
Thy-1 T-cell antigen	THY1	4
Thyroxin-binding globulin	TBG	2
Tocopherol (alpha) transfer protein	TTPA	2
Topoisomerase I		1
Tofticollis, keloids, cryptorchidism and renal dysplasia gene	TKCR	6
Transacylase		1
Transferrin receptor	TFRC	6
Transforming growth factor, beta 2	TGFB2	6
Transforming growth factor, beta induced	TGFB1	6
Transforming growth factor, beta receptor 2	TGFB2	6
Transketolase-like 1	TKTL1	1
Transthyretin	TTR	2
Tremor, essential 1	ETM1	5
Tremor, essential 2	ETM2	5
Triosephosphate isomerase	TPI1	1
Tropomyosin 3 (non-muscle)	TPM3	3
Tryptophan hydroxylase	TPH	1
Tubby-like protein 1	TULP1	6
Tuberous sclerosis 1	TSC1	6
Tuberous sclerosis 2	TSC2	6
Tumour necrosis factor (TNF) receptor associated factor 1	TRAF1	4
Tumour necrosis factor (TNF) receptor associated factor 2	TRAF2	4
Tumour necrosis factor (TNF) receptor associated factor 3	TRAF3	4
Tumour necrosis factor (TNF) receptor associated factor 4	TRAF4	4
Tumour necrosis factor (TNF) receptor associated factor 5	TRAF5	4
Tumour necrosis factor (TNF) receptor associated factor 6	TRAF6	4
Tumour necrosis factor alpha	TNFA	4
Tumour necrosis factor alpha receptor	TNFAR	4
Tumour necrosis factor beta	TNFB	4
Tumour necrosis factor beta receptor	TNFB2	4
Tumour protein p53	TP53,P53	6
Tumour protein p73	TP73	6
Tyrosine aminotransferase	TAT	1
Tyrosine hydroxylase	TH	1

Ubiquitin		6
Ubiquitin B	UBB	6
Ubiquitin C	UBC	6
Ubiquitin carboxyl-terminal esterase L1	UCHL1	6
UDP-glucuronosyltransferase 1	ugt1d, UGTL	1
UDP-glucuronosyltransferase 2	UGT2	1
Urate oxidase	UOX	1
Uridinediphosphate(UDP)-galactose-4-epimerase	GALE	1
Uroporphyrinogen III synthase	UROS	1
Usher syndrome 2A	USH2A	3
Vacuolar proton pump, subunit 1	VPP1	5
Vacuolar proton pump, subunit 3	VPP3	5
Vasoactive intestinal polypeptide	VIP	5
Vasoactive intestinal polypeptide receptor	VIPR	5
Vesicular monoamine transporter 1	VMAT1	5
Vesicular monoamine transporter 2	VMAT2	5
Vitamin B12-binding (R) protein		6
Von Hippel-Lindau gene	VHL	6
Wolf-Hirschhorn syndrome candidate I gene	WHSC1	6
Wolfram syndrome 1 gene	WFS1	3
Xanthine dehydrogenase	XDH	1
Xeroderma pigmentosum, complementation group A	XPA	1
Zinc finger protein 2	ZIC2	3

Legende für die Spalte Proteinfunktion:

1	Enzym	2	Transport und Lagerung
3	Struktur	4	Immunität
5	Nervale Transmission	6	Wachstum und Differenzierung

**Tabelle 4**  
**aggressive Symptome oder Verhaltensstörungen**

Liste der Gene	HUGO Gensymbol	Protein- funktion
11 beta Hydroxysteroid dehydrogenase 2	HSD11B2	1
4-Hydroxyphenylpyruvate dioxygenase	HPD	1
Acetylcholine receptor, nicotinic, alpha A1	CHRNA1	5
Acetylcholine receptor, nicotinic, alpha A2	CHRNA2	5
Acetylcholine receptor, nicotinic, alpha A3	CHRNA3	5
Acetylcholine receptor, nicotinic, alpha A4	CHRNA4	5
Acetylcholine receptor, nicotinic, alpha A5	CHRNA5	5
Acetylcholine receptor, nicotinic, alpha A6	CHRNA6	5
Acetylcholine receptor, nicotinic, alpha A7	CHRNA7	5
Acetylcholine receptor, nicotinic, beta 1	CHRNA1	5
Acetylcholine receptor, nicotinic, beta 2	CHRNA2	5
Acetylcholine receptor, nicotinic, beta 3	CHRNA3	5
Acetylcholine receptor, nicotinic, beta 4	CHRNA4	5
Acetylcholine receptor, nicotinic, epsilon	CHRNA5	5
Acetylcholine receptor, nicotinic, gamma	CHRNA6	5
Acetylcholinesterase	ACHE	1
Adenylate cyclase 1	ADCY1	1
Adenylate cyclase 2	ADCY2	1
Adenylate cyclase 3	ADCY3	1
Adenylate cyclase 4	ADCY4	1
Adenylate cyclase 5	ADCY5	1
Adenylate cyclase 6	ADCY6	1
Adenylate cyclase 7	ADCY7	1
Adenylate cyclase 8	ADCY8	1
Adenylate cyclase 9	ADCY9	1
alpha-Synuclein	SNCA	5
Amyloid beta A4 precursor protein	APP	5
Amyloid beta A4 precursor-like protein	APLP	5
Androgen binding protein	ABP	2
Androgen receptor	AR	6
Apolipoprotein E	APOE	2
Arginosuccinate synthetase	ASS	1
Ataxia telangiectasia gene, AT	ATM	6
beta-synuclein	SNCB	5
Ca(2+) transporting ATPase, slow twitch	ATP2A2	2
Cannabinoid receptor	CNR1	5
Carbonic anhydrase 3	CA3	1
Carbonic anhydrase 4	CA4	1
Carbonic anhydrase, alpha	CA1	1
Carbonic anhydrase, beta	CA2	1
Catechol-o-methyltransferase	COMT	1

Cholecystokinin	CCK	5
Cholecystokinin B receptor	CCKBR	5
Choline acetyltransferase	CHAT	1
Ciliary neurotrophic factor (CNTF)	CNTF	6
Ciliary neurotrophic factor (CNTF) receptor	CNTFR	6
Corticotrophin-releasing hormone	CRH	2
Corticotrophin-releasing hormone receptor	CRHR1	2
Cryptochrome 1	CRY1	3
Cryptochrome 2	CRY2	3
Cu <sup>2+</sup> transporting ATPase beta polypeptide	ATP7B	1
Cyclic AMP-dependent protein kinase	PKA	1
Cyclooxygenase 1	COX1	1
Cyclooxygenase 2	COX2	1
CYP11A1	CYP11A1	1
CYP11B1	CYP11B1	1
CYP11B2	CYP11B2	1
CYP17	CYP17	1
CYP19	CYP19	1
CYP1A1	CYP1A1	1
CYP1A2	CYP1A2	1
CYP1B1	CYP1B1	1
CYP21	CYP21	1
CYP24	CYP24	1
CYP27	CYP27	1
CYP27B1	PDDR	1
CYP2A1	CYP2A1	1
CYP2A13	CYP2A13	1
CYP2A3	CYP2A3	1
CYP2A6V2	CYP2A6V2	1
CYP2A7	CYP2A7	1
CYP2B6	CYP2B6	1
CYP2C18	CYP2C18	1
CYP2C19	CYP2C19	1
CYP2C8	CYP2C8	1
CYP2C9	CYP2C9	1
CYP2D6	CYP2D6	1
CYP2E1	CYP2E1	1
CYP2F1	CYP2F1	1
CYP2J2	CYP2J2	1
CYP3A3	CYP3A3	1
CYP3A4	CYP3A4	1
CYP3A5	CYP3A5	1
CYP3A7	CYP3A7	1
CYP4A11	CYP4A11	1
CYP4B1	CYP4B1	1
CYP4F2	CYP4F2	1
CYP4F3	CYP4F3	1

CYP51	CYP51	1
CYP5A1	CYP5A1	1
CYP7A	CYP7A	1
CYP8	CYPB	1
Cystathionase	CTH	1
Cystathione beta synthase	CBS	1
Cytidine deaminase	CDA	1
Cytidine-5-prime-triphosphate synthetase	CTPS	1
Cytochrome a		1
Cytochrome c		1
Cytochrome c oxidase, MTCO		1
Dihydrolipoamide branched chain transacylase DBT		5
Dopamine beta hydroxylase	DBH	1
Dopamine receptors D1	DRD1	5
Dopamine receptors D2	DRD2	5
Dopamine receptors D3	DRD3	5
Dopamine receptors D4	DRD4	5
Dopamine receptors D5	DRD5	5
Doublecortin, DCX	DCX	3
Enolase	EN01	1
Flightless-II, Drosophila homolog of	FLII	6
Fragile site, folic acid type, rare, fra(X) A	FRAXA	5
Fragile site, folic acid type, rare, fra(X) E	FRAXE	5
Fragile site, folic acid type, rare, fra(X) F	FRAXF	5
GABA receptor, alpha 1	GABRA1	5
GABA receptor, alpha 2	GABRA2	5
GABA receptor, alpha 3	GABRA3	5
GABA receptor, alpha 4	GABRA4	5
GABA receptor, alpha 5	GABRA5	5
GABA receptor, alpha 6	GABRA6	5
GABA receptor, beta 1	GABRB1	5
GABA receptor, beta 2	GABRB2	5
GABA receptor, beta 3	GABRB3	5
GABA receptor, gamma 1	GABRG1	5
GABA receptor, gamma 2	GABRG2	5
GABA receptor, gamma 3	GABRG3	5
Galactose 1-phosphate uridyl-transferase	GALT	1
Geniospasm 1	GSM1	6
Glutathione	GSH	2
Glutathione S-transferase, GSTZ1	GSTZ1	1
Glyceraldehyde-3-phosphate dehydrogenase, GAPDH	GAPDH	1
Glycerol kinase	GK	1
Glycinamide ribonucleotide (GAR) transformylase	GART	1
GM2 ganglioside activator protein, GM2A	GM2A	1
Gustducin, alpha (taste-specific G protein)	GDCA	5

Inositol monophosphatase	IMPA1	5
IP3 kinase		1
Mannosidase, beta A lysosomal	MAN1A	1
Melatonin receptor 1 A	MTNR1A	5
Melatonin receptor 1 B	MTNR1B	5
Monoamine oxidase A	MAOA	1
Monoamine oxidase B	MAOB	1
Muscarinic receptor, M1	CHRM1	5
Muscarinic receptor, M2	CHRM2	5
Muscarinic receptor, M3	CHRM3	5
Muscarinic receptor, M4	CHRM4	5
Muscarinic receptor, M5	CHRM5	5
N-acetylglucosamine-6-sulfatase reductase	GNS	1
Neurokinin A	NKNA	5
Neurokinin B	NKNB	5
Neuropeptide Y	NPY	5
Neuropeptide Y receptor Y1	NPY1R	5
Neuropeptide Y receptor Y2	NPY2R	5
Neurotensin	NTS	5
Neurotensin receptor	NTSR1	5
Nitric oxide synthase 1, NOS1	NOS1	1
Nitric oxide synthase 2, NOS2	NOS2	1
Nitric oxide synthase 3, NOS3	NOS3	1
Ocular albinism 1	OA1	3
Opioid receptor, delta	OPRD1	5
Opioid receptor, kappa	OPRK1	5
Opioid receptor, mu	OPRM1	5
Orexin	OX	6
Orexin 1 receptor	OX1R	6
Orexin 2 receptor	OX2R	6
Phosphoglycerate kinase 1	PGK1	1
Potassium inwardly-rectifying channel J1	KCNJ1	5
Potassium voltage-gated channel E1	KCNE1	5
Potassium voltage-gated channel Q1	KCNQ1	5
Preproenkephalin	PENK	5
Preproglucagon	GCG, GLP1, GLP2	6
Prion protein	PRNP	5
Proline dehydrogenase	PRODH	1
Pro-melanin-concentrating hormone	PMCH	6
Proopiomelanocortin	POMC	5
Purine nucleoside phosphorylase	NP	1
RIGUI	RIGUI	6
Serotonin N-acetyltransferase	SNAT	
Serotonin receptor, 5HT1A	HTR1A	5
Serotonin receptor, 5HT1B	HTR1B	5
Serotonin receptor, 5HT1C	HTR1C	5

Serotonin receptor, 5HT1D	HTR1D	5
Serotonin receptor, 5HT1E	HTR1E	5
Serotonin receptor, 5HT1F	HTR1F	5
Serotonin receptor, 5HT2A	HTR2A	5
Serotonin receptor, 5HT2B	HTR2B	5
Serotonin receptor, 5HT2C	HTR2C	5
Serotonin receptor, 5HT3	HTR3	5
Serotonin receptor, 5HT4	HTR4	5
Serotonin receptor, 5HT5	HTR5	5
Serotonin receptor, 5HT6	HTR6	5
Serotonin receptor, 5HT7	HTR7	5
Solute carrier family 18, member 3	SLC18A3	2
Solute carrier family 6 (GAMMA-AMINO-BUTYRIC ACID transporter), member 1	SLC6A1	2
Solute carrier family 6 (neurotransmitter transporter, dopamine), member 3	SLC6A3	2
Solute carrier family 6 (neurotransmitter transporter, noradrenaline), member 2	SLC6A2	2
Solute carrier family 6 (neurotransmitter transporter, serotonin), member 4	SLC6A4	2
Synapsin Ia & 1 b	SYN1	5
Synapsin 2a & 2b	SYN2	5
Synaptogynin		5
Synaptophysin	SYP	5
Synaptosomal-associated protein, 25KD	SNAP25	5
Syntaxin 1	STX1	5
Tachykinin receptor, NK1R	TACR1	5
Tachykinin receptor, NK2R	TACR2	5
Tachykinin receptor, NK3R	TACR3	5
Tau protein	MAPT	3
Tryptophan hydroxylase	TPH	1
Tyrosine hydroxylase	TH	1
Ubiquitin		6
Ubiquitin B	UBB	6
Ubiquitin C	UBC	6
UDP-glucuronosyltransferase 1	ugt1d, UGT1	1
UDP-glucuronosyltransferase 2	UGT2	1
Vacuolar proton pump, subunit 1	VPPI	5
Vacuolar proton pump, subunit 3	VPP3	5
Vasoactive intestinal polypeptide	VIP	5
Vasoactive intestinal polypeptide receptor	VIPR	5,

## Legende für die Spalte Proteinfunktion:

1	Enzym	2	Transport und Lagerung
3	Struktur	4	Immunität
5	Nervale Transmission	6	Wachstum und Differenzierung

## Tabelle 5

### Gehirnverletzungen

#### Liste der Gene

HUGO Gensymbol	Protein- funktion
BPGM	1
HSD3B2	1
HPD	1
MTHFR	1
PTS	1
ACAT2	1
ACAA	1
CHRNAL	5
CHRNA2	5
CHRNA3	5
CHRNA4	5
CHRNA5	5
CHRNA6	5
CHRNA7	5
CHRNBL	5
CHRNB2	5
CHRNB3	5
CHRNB4	5
CHRNE	5
CHRNG	5
ACHE	1
ADDI	3
ADD2	3
ADORAL	5
ADORA2A	5
ADORA2B	5
ADORA3	5
ADCY1	1
ADCY2	1
ADCY3	1
ADCY4	1
ADCY5	1
ADCY6	1
ADCY7	1
ADCY8	1
ADCY9	1
ADRAL	5
ADRA2	5
ADRB1	5
ADRB2	5

2,3-bisphosphoglycerate mutase  
 3-beta hydroxysteroid dehydrogenase 2  
 4-hydroxyphenylpyruvate dioxygenase  
 5,10-methylenetetrahydrofolate reductase  
 (NADPH)  
 6-pyruvoyltetrahydropterin synthase  
 Acetoacetyl 2-CoA-thiolase  
 Acetyl CoA acyltransferase  
 Acetylcholine receptor, nicotinic, alpha A1  
 Acetylcholine receptor, nicotinic, alpha A2  
 Acetylcholine receptor, nicotinic, alpha A3  
 Acetylcholine receptor, nicotinic, alpha A4  
 Acetylcholine receptor, nicotinic, alpha A5  
 Acetylcholine receptor, nicotinic, alpha A6  
 Acetylcholine receptor, nicotinic, alpha A7  
 Acetylcholine receptor, nicotinic, beta 1  
 Acetylcholine receptor, nicotinic, beta 2  
 Acetylcholine receptor, nicotinic, beta 3  
 Acetylcholine receptor, nicotinic, beta 4  
 Acetylcholine receptor, nicotinic, epsilon  
 Acetylcholine receptor, nicotinic, gamma  
 Acetylcholinesterase  
 Adducin, alpha  
 Adducin, beta  
 Adenosine receptor A1  
 Adenosine receptor A2A  
 Adenosine receptor A2B  
 Adenosine receptor A3  
 Adenylate cyclase 1  
 Adenylate cyclase 2  
 Adenylate cyclase 3  
 Adenylate cyclase 4  
 Adenylate cyclase 5  
 Adenylate cyclase 6  
 Adenylate cyclase 7  
 Adenylate cyclase 8  
 Adenylate cyclase 9  
 Adrenergic receptor, alpha1  
 Adrenergic receptor, alpha2  
 Adrenergic receptor, beta1  
 Adrenergic receptor, beta2



Adrenergic receptor, beta3	ADRB3	5
Adrenocorticotrophic hormone (ACTH) receptor	ACTHR	6
Albumin, ALB	ALB	2
Aldehyde dehydrogenase 10	ALDH10	1
Aldosterone receptor	MLR	6
Alpha 1 acid glycoprotein	AAG;AGP	2
Alpha 2 macroglobulin	A2M	4
alpha thalassemia gene	ATRX	5
alpha 1-antitrypsin	PI	1
alpha 2-antiplasmin	PLI	1
alpha-synuclein	SNCA	5
Aminomethyltransferase	AMT	1
Aminopeptidase P	XPNPEP2	1
Amyloid beta (A4) precursor protein-binding, APBB1	APBB1	5
Amyloid beta A4 precursor protein	APP	5
Amyloid beta A4 precursor-like protein	APLP	5
Angiopoietin 1	ANGPT1	6
Angiopoietin 2	ANGPT2	6
Angiotensin converting enzyme	ACE, DCPI	1
Angiotensin receptor 1	AGTRL	2
Angiotensin receptor 2	AGTR2	2
Angiotensinogen	AGT	1
Annexin 1	ANX 1	1
Antidiuretic hormone receptor	ADHR	2
Antithrombin III	AT3	1
Apolipoprotein A I	APOAL	2
Apolipoprotein A II	APOA2	2
Apolipoprotein B	APOB	2
Apolipoprotein C1	APOCI	2
Apolipoprotein C2	APOC2	2
Apolipoprotein C3	APOC3	2
Apolipoprotein D	APOD	2
Apolipoprotein E	APOE	2
Apolipoprotein H	APOH	2
Apoptosis antigen 1	APTI	4
Arginase	ARG1	1
Arginine vasopressin	AVP	5
Arginine vasopressin receptor 1A	AVPR1A	5
Arginine vasopressin receptor 1 B	AVPR1B	5
Arginine vasopressin receptor 2	AVPR2	5
Arginosuccinate lyase	ASL	1
Arginosuccinate synthetase	ASS	1
Arylsulfatase A	ARSA	1
Arylsulfatase D	ARSD	1
Arylsulfatase E	ARSE	1

Arylsulfatase F	ARSF	1
Aspartoacylase	ASPA	1
Ataxia telangiectasia gene, AT	ATM	6
Atrial natriuretic peptide	ANP	6
Atrial natriuretic peptide receptor A	NPRI	6
Atrial natriuretic peptide receptor B	NPR2	6
Atrial natriuretic peptide receptor C	NPR3	6
Bagpipe homeobox, drosophila homolog of, 1	BAPXL	6
beta-synuclein	SNCB	5
Bleomycin hydrolase	BLMH	1
Bradykinin receptor B1		1
Bradykinin receptor B2		1
Brain derived neurotrophic factor	BDNF	6
Brain derived neurotrophic factor (BDNF) receptor	BDNFR	6
Butyrylcholinesterase	BCHE	1
Ca(2+) transporting ATPase, slow twitch	ATP2A2	2
Cadherin E	CDHI	6
Cadherin EP		6
Cadherin N	CDH2	6
Cadherin P	CDH3	6
Calbindin	CALB1	6
Calbindin D9K	CALB3	6
Calcineurin A1	CALNAL	1
Calcineurin A2	CALNA2	1
Calcineurin A3	CALNA3	1
Calcineurin B		
Calcitonin/Calcitonin gene-related peptide alpha	CALCA	5
Calcium channel, voltage-dependent, alpha 1F subunit	CACNA1F	5
Calcium channel, voltage-dependent, Alpha-1B (CACNL1A5)	CACNA1B	5
Calcium channel, voltage-dependent, Alpha-1C	CACNA1C	5
Calcium channel, voltage-dependent, Alpha-1D	CACNA1D	5
Calcium channel, voltage-dependent, Alpha-1E (CACNL1A6)	CACNA1E	5
Calcium channel, voltage-dependent, Alpha-2/delta	CACNA2	5
Calcium channel, voltage-dependent, Beta 1	CACNBI	5
Calcium channel, voltage-dependent, Beta 3	CACNB3	5
Calcium channel, voltage-dependent, L type, alpha 1S subunit	CACNA1S	5
Calcium channel, voltage-dependent, Neuronal, Gamma	CACNG2	5
Calcium channel, voltage-dependent, P/Q type, alpha 1A subunit	CACNA1A	5

Calcium channel, voltage-dependent, T-type		5
Calmodulin 1	CALM1	6
Calmodulin 2	CALM2	6
Calmodulin 3	CALM3	6
Calmodulin-dependant protein kinase II	CAMK2A	6
Calnexin	CANX	6
Calpain	CAPN,CAPN3	1
Calretinin	CALB2	5
Carbonic anhydrase 3	CA3	1
Carbonic anhydrase 4	CA4	1
Carbonic anhydrase, alpha	CA1	1
Carbonic anhydrase, beta	CA2	1
Cardiac-specific homeobox, CSX	CSX	6
Carnosinase		5
Caspase 1	CASP1	6
Caspase 10	CASP10	6
Caspase 2	CASP2	6
Caspase 3	CASP3	6
Caspase 4	CASP4	6
Caspase 5	CASP5	6
Caspase 6	CASP6	6
Caspase 7	CASP7	6
Caspase 8	CASP8	6
Caspase 9	CASP9	6
Catechol-o-methyltransferase	COMT	1
CD1	CD1	1
CD4	CD4	1
Cell adhesion molecule, intercellular, LCAM	ICAM1	6
Cell adhesion molecule, leukocyte- endothelial, LECAM (CD62)	LECAM1	6
Cell adhesion molecule, liver, LCAM	LCAM	6
Cell adhesion molecule, neural, NCAM1	NCAM1	6
Cell adhesion molecule, neural, NCAM2	NCAM2	6
Cell adhesion molecule, platelet-endothelial, PECAM	PECAM	6
Cell adhesion molecule, vascular, VCAM	VCAM1	6
Ceroid lipofuscinosis neuronal 2	CLN2	5
Ceroid lipofuscinosis neuronal 3	CLN3	5
Ceroid lipofuscinosis neuronal 4	CLN4	5
Ceroid lipofuscinosis neuronal 5	CLN5	5
Ceroid lipofuscinosis neuronal 6	CLN6	5
Chemokine receptor CXCR4	CXCR	4
Choline acetyltransferase	CHAT	1
Chymotrypsinogen		1
Cockayne syndrome gene, CKN1	CKN1	6
Cofilin		3
Collagen I alpha 1	COL1A1	3

Collagen I alpha 2	COL1A2	3
Collagen II alpha 1	COL2A1	3
Collagen III alpha 1	COL3A1	3
Collagen IV alpha 1	COL4A1	3
Collagen IV alpha 2	COL4A2	3
Collagen IV alpha 3	COL4A3	3
Collagen IV alpha 4	COL4A4	3
Collagen IV alpha 5	COL4A5	3
Collagen IV alpha 6	COL4A6	3
Collagen IX alpha 2	COL9A2, EDM2	3
Collagen IX alpha 3	COL9A3	3
Collagen receptor	COLR	3
Collagen V alpha 1	COL5A1	3
Collagen V alpha 2	COL5A2	3
Collagen VI alpha 1	COL6A1	3
Collagen VI alpha 2	COL6A2	3
Collagen VI alpha 3	COL6A3	3
Collagen VII alpha 1	COL7A1	3
Collagen X alpha 1	COL10A1	3
Collagen X alpha 1	COL11A1	3
Collagen XI alpha 2	COL11A2	3
Collagen XVII alpha 1	COL17A1	3
Corticotrophin-releasing hormone	CRH	2
Corticotrophin-releasing hormone receptor	CRHR1	2
Creb binding protein	CREBBP	6
Cu <sup>2+</sup> transporting ATPase beta polypeptide	ATP7B	1
Cyclic AMP-dependent protein kinase	PKA	1
Cyclic nucleotide phosphodiesterase 2A3	PDE2A3	1
Cyclic nucleotide phosphodiesterase 3A	PDE3A	1
Cyclic nucleotide phosphodiesterase 3B	PDE3B	1
Cyclic nucleotide phosphodiesterase 4A	PDE4A	1
Cyclic nucleotide phosphodiesterase 4C	PDE4C	1
Cyclic nucleotide phosphodiesterase 5A	PDE5A	1
Cyclic nucleotide phosphodiesterase 6A	PDE6A	1
Cyclic nucleotide phosphodiesterase 6B	PDE6B	1
Cyclic nucleotide phosphodiesterase 7	PDE7	1
Cyclic nucleotide phosphodiesterase 8	PDE8	1
Cyclic nucleotide phosphodiesterase 9A	PDE9A	1
Cyclooxygenase 1	COX1	1
Cyclooxygenase 2	COX2	1
CYP11A1	CYP11A1	1
CYP11B1	CYP11B1	1
CYP11B2	CYP11B2	1
CYP17	CYP17	1
CYP19	CYP19	1
CYP1A1	CYP1A1	1
CYP1A2	CYP1A2	1

CYP1B1	CYP1B1	1
CYP21	CYP21	1
CYP24	CYP24	1
CYP27	CYP27	1
CYP27B1	PDDR	1
CYP2A1	CYP2A1	1
CYP2A13	CYP2A13	1
CYP2A3	CYP2A3	1
CYP2A6V2	CYP2A6V2	1
CYP2A7	CYP2A7	1
CYP2B6	CYP2B6	1
CYP2C18	CYP2C18	1
CYP2C19	CYP2C19	1
CYP2C8	CYP2C8	1
CYP2C9	CYP2C9	1
CYP2D6	CYP2D6	1
CYP2E1	CYP2E1	1
CYP2F1	CYP2F1	1
CYP2J2	CYP2J2	1
CYP3A3	CYP3A3	1
CYP3A4	CYP3A4	1
CYP3A5	CYP3A5	1
CYP3A7	CYP3A7	1
CYP4A11	CYP4A11	1
CYP4B1	CYP4B1	1
CYP4F2	CYP4F2	1
CYP4F3	CYP4F3	1
CYP51	CYP51	1
CYP5A1	CYP5A1	1
CYP7A	CYP7A	1
CYP8	CYP8	1
Cystatin B	CSTB	2
Cystatin C	CST3	2
Cytidine-5-prime-triphosphate synthetase	CTPS	1
Cytochrome a		1
Cytochrome c		1
Cytochrome c oxidase, MTCO		1
Cytokine-suppressive antiinflammatory drug-binding protein 1	CSBPI	4
Cytokine-suppressive antiinflammatory drug-binding protein 2	CSBP2	4
DAX1 nuclear receptor	DAX1	
Deleted in malignant brain tumours 1	DMBT1	6
Delta-7-dehydrocholesterol reductase	DHCR7	1
Dihydrolipoamide branched chain transacylase	DBT	5
Dihydroxyacetonephosphate acyltransferase	DHAPAT	1

Dopamine beta hydroxylase	DBH	1
Dopamine receptors D1	DRD1	5
Dopamine receptors D2	DRD2	5
Dopamine receptors D3	DRD3	5
Dopamine receptors D4	DRD4	5
Dopamine receptors D5	DRD5	5
Dystonia 9	CSE	3
Dystrophia myotonica	DM,DMPK	1
Dystrophia myotonica, atypical	DM2	1
Dystrophin	DMD	3
Ectodermal Dysplasia 1 gene	ED1	3
Empty spiracles (drosophila) homologue 1	EMXL	6
Empty spiracles (drosophila) homologue 2	EMX2	6
Endothelin 1	EDN1	5
Endothelin 2	EDN2	5
Endothelin 3	EDN3	5
Endothelin converting enzyme	ECE1	5
Endothelin receptor type A	EDNRA	5
Endothelin receptor type B	EDNRB	5
Enolase	ENO1	1
Epidermal growth factor	EGF	6
Epidermal growth factor receptor	EGFR	6
Epilepsy, benign neonatal 4 gene	ICCA	1
Epilepsy, female restricted	EFMR	1
Epilepsy, progressive myoclonic 2 gene	EPM2A	1
Excision repair complementation group 4 protein	ERCC4	1
Factor 1 (No. one)	F1	4
Factor III	F3	4
Factor IX	F9	4
Factor V	F5	4
Factor VII	F7	4
Factor VIII	F8	4
Factor X	F10	4
Factor XI	F11	4
Factor XII	F12	4
Factor XIII A & B	F13A & F13B	4
Fanconi anemia, complementation group C	FANCC	2
Fanconi anemia, complementation group D	FANCD	2
Fibrinogen alpha	FGA	3
Fibrinogen beta	FGB	3
Fibrinogen gamma	FGG	3
Fibroblast growth factor	FGF1	6
Fibroblast growth factor receptor 1	FGFR1	6
Fibroblast growth factor receptor 2	FGFR2	6
Fibroblast growth factor receptor 3	FGFR3	6
Fibronectin precursor	FN1	6

Flightless-II, Drosophila homolog of	FLII	6
Follicle stimulating hormone receptor	FSHR, ODG1	6
Follicle stimulating hormone, FSH	FSHB	6
Formiminotransferase		1
Fragile site, folic acid type, rare, fra(X) A	FRAXA	5
Fragile site, folic acid type, rare, fra(X) E	FRAXE	5
Fragile site, folic acid type, rare, fra(X) F	FRAXF	5
Frataxin	FRDA	6
Fukuyama type congenital muscular dystrophy	FCMD	6
Fumarase	FH	1
GABA receptor, alpha 1	GABRA1	5
GABA receptor, alpha 2	GABRA2	5
GABA receptor, alpha 3	GABRA3	5
GABA receptor, alpha 4	GABRA4	5
GABA receptor, alpha 5	GABRA5	5
GABA receptor, alpha 6	GABRA6	5
GABA receptor, beta 1	GABRB1	5
GABA receptor, beta 2	GABRB2	5
GABA receptor, beta 3	GABRB3	5
GABA receptor, gamma 1	GABRG1	5
GABA receptor, gamma 2	GABRG2	5
GABA receptor, gamma 3	GABRG3	5
GABA transaminase	ABAT	1
Galactosyltransferase 1	GT1	6
Galactosyltransferase, alpha 1,3	GGTA1	6
Galactosyltransferase, beta 3	B3GALT	6
Galanin	GAL	5
Galanin receptor	GALNR1	5
Gamma-glutamyltransferase I	GGT1	2
Gastric Intrinsic factor, GIF	GIF	1
GDP dissociation inhibitor I	GDI1	6
Glial-cell derived neurotrophic factor (GDNF) receptor		5
Glial-cell derived neurotrophic factor, GDNF	GDNF	5
Glioma chloride ion channel, GCC		6
Gamma-aminobutyrate decarboxylase, GAD	GADI	1
Glutamate receptor 1	GLUR1	5
Glutamate receptor 2	GLUR2	5
Glutamate receptor 3	GLUR3	5
Glutamate receptor 4	GLUR4	5
Glutamate receptor 5	GLUR5	5
Glutamate receptor 6	GLUR6	5
Glutamate receptor 7	GLUR7	5
Glutamate receptor, ionotropic, NMDA 1	NMDAR1	5
Glutamate receptor, ionotropic, NMDA 2A	NMDAR2A	5
Glutamate receptor, ionotropic, NMDA 2B	NMDAR2B	5
Glutamate receptor, ionotropic, NMDA 2C	NMDAR2C	5

Glutamate receptor, ionotropic, NMDA 2D	NMDAR2D	5
Glutaryl-CoA dehydrogenase	GCDH	1
Glutathione	GSH	2
Glutathione S-transferase, GSTZ1	GSTZ1	1
Glutathione synthetase	GSS	1
Glyceraldehyde-3-phosphate dehydrogenase, GAPDH	GAPDH	1
Glycerol kinase	GK	1
Glycinamide ribonucleotide (GAR) transformylase	GART	1
Glycine dehydrogenase	GLDC	1
GM2 ganglioside activator protein, GM2A	GM2A	1
Gonadotropin releasing hormone receptor	GNRHR	6
GTP cylcohydrolase I	GCH1	6
Guanine nucleotide-binding protein, alpha activating activity polypeptide, GNAO	GNAOI	5
Guanylate cyclase 2D, membrane (retina-specific)	GUCY2D	1
Guanylate cyclase activator 1A (retina)	GUCA1A	1
Guanylyl cyclase		1
Haeme regulated inhibitor kinase		1
Haemoglobin alpha 1	HBA1	2
Haemoglobin alpha 2	HBA2	2
Haemoglobin beta	HBB	2
Haemoglobin delta	HBD	2
Haemoglobin gamma A	HBG1	2
Haemoglobin gamma B	HBG2	2
Haemoglobin gamma G	HBGG	2
Heparan sulfamidase		1
Heparin binding epidermal growth factor	HBEGF	6
Heparin Cofactor II	HCF2	4
Hepatic lipase	LIPC	1
Hexosaminidase A	HEXA,TSD	1
Hexosaminidase B	HEXB	1
Histamine receptors, H1		5
Histamine receptors, H2		5
Histamine receptors, H3		5
Histidase		1
HLA-B associated transcript 1	BAT1	
HMG-CoA reductase	HMGCR	1
Holocarboxylase synthetase	HLCS	1
Holoprosencephaly 1	HPE1	6
Holoprosencephaly 2	HPE2	6
Holoprosencephaly 3	HPE3	6
Holoprosencephaly 4	HPE4	6
Hypoxia inducible factor 1	HIF1A	1
Hypoxia inducible factor 2		1



IC7 A and B		4
Inositol 1,4,5-triphosphate receptor 1	ITPR1	6
Inositol monophosphatase	IMPA1	5
Insulin	INS	6
Insulin receptor	INSR	6
Insulin-like growth factor 1	IGF1	6
Insulin-like growth factor 1 receptor	IGF1R	6
Insulin-like growth factor 2	IGF2	6
Insulin-like growth factor 2 receptor	IGF2R	6
Integrin beta 1	ITGB1	6
Integrin beta 2	ITGB2	6
Integrin beta 3	ITGB3	6
Integrin beta 4	ITGB4	6
Integrin beta 5	ITGB5	6
Integrin beta 6	ITGB6	6
Integrin beta 7	ITGB7	6
Integrin, alpha 1	ITGAL	6
Integrin, alpha 2	ITGA2	6
Integrin, alpha 3	ITGA3	6
Integrin, alpha 4	ITGA4	6
Integrin, alpha 5	ITGA5	6
Integrin, alpha 6	ITGA6	6
Integrin, alpha 7	ITGA7	6
Integrin, alpha 8	ITGA8	6
Integrin, alpha 9	ITGA9	6
Integrin, alpha M	ITGAM	6
Integrin, alpha X	ITGAX	6
Inter-alpha-trypsin inhibitor, IATI		1
Interleukin(IL) 1 receptor	IL1R	4
Interleukin(IL) 1, alpha	IL1A	4
Interleukin(IL) 1, beta	IL1B	4
Interleukin(IL) 10	IL10	4
Interleukin(IL) 10 receptor	IL10R	4
Interleukin(IL) 11	IL11	4
Interleukin(IL) 11 receptor	IL11R	4
Interleukin(IL) 12	IL12	4
Interleukin(IL) 12 receptor, beta	IL12RB1	4
Interleukin(IL) 13	IL13	4
Interleukin(IL) 13 receptor	IL13R	4
Interleukin(IL) 2	IL2	4
Interleukin(IL) 2 receptor, alpha	IL2RA	4
Interleukin(IL) 2 receptor, gamma	IL2RG	4
Interleukin(IL) 3	IL3	4
Interleukin(IL) 3 receptor	IL3R	4
Interleukin(IL) 4	IL4	4
Interleukin(IL) 4 receptor	IL4R	4
Interleukin(IL) 5	IL5	4

Interleukin(IL) 5 receptor	IL5R	4
Interleukin(IL) 6	IL6	4
Interleukin(IL) 6 receptor	IL6R	4
Interleukin(IL) 7	IL7	4
Interleukin(IL) 7 receptor	IL7R	4
Interleukin(IL) 8	IL8	4
Interleukin(IL) 8 receptor	IL8R	4
Interleukin(IL) 9	IL9	4
Interleukin(IL) 9 receptor	IL9R	4
Interleukin(IL) receptor antagonist 1	IL1RN, IL1RA	
IP3 kinase		1
Kallikrein 3	KAK3	4
Kininogen, High molecular weight	KNG	4
Kynureninase		1
Laminin 5, alpha 3	LAMA3	6
Laminin 5, beta 3	LAMB3	6
Laminin 5, gamma 2	LAMC2	6
Laminin M	LAMM	6
Laminin receptor 1	LAMR1	6
Latent transforming growth factor-beta binding protein 2	LTBP2	6
Leptin	LEP	6
Leptin receptor	LEPR	6
Leukin		4
Leukocyte-specific transcript 1	LST-1	4
Leukotriene A4 hydrolase		
Leukotriene A4 synthase	LTA4S	1
Leukotriene B4 receptor		4
Leukotriene B4 synthase	LTB4S	1
Leukotriene C4 receptor		4
Leukotriene C4 synthase	LTC4S	1
Leukotriene D4/E4 receptor		4
LIM homeobox protein 1	LHX1	6
LIM-Kinase I (LINK-1)		4
Lipocortin 1	ANX4	4
Lipoprotein lipase	LPL	4
Lipoprotein receptor, Low Density	LDLR	2
Lipoprotein, High Density	HDLDT1	2
Lipoprotein, Intermediate Density		2
Lipoprotein, Low Density 1		2
Lipoprotein, Low Density 2		2
Lipoprotein, Very Low Density	VLDLR	2
Lipoprotein-associated coagulation factor	LACI	4
Low density lipoprotein receptor-related protein precursor	LRP	2
Lymphoid enhancer-binding factor	LEF-1	6

MAD (mothers against decapentaplegic, Drosophila) homologue 4	MADH4	6
Malonyl CoA decarboxylase		1
Mannosidase, alpha B lysosomal	MANB	1
Mannosidase, -beta A lysosomal	MANBA	1
Methionine synthase	MTR	1
Methylmalonyl-CoA mutase	MUT	1
Mevalonate kinase	MVK	1
Mismatch repair gene, PMSL2	PMS2	6
Molybdenum cofactor synthesis 1	MOCS1	1
Molybdenum cofactor synthesis 2	MOCS2	1
Monoamine oxidase A	MAOA	1
Monoamine oxidase B	MAOB	1
Mucopolidoses	GNPTA	1
Muscarinic receptor, M1	CHRM1	5
Muscarinic receptor, M2	CHRM2	5
Muscarinic receptor, M3	CHRM3	5
Muscarinic receptor, M4	CHRM4	5
Muscarinic receptor, M5	CHRM5	5
Myelin basic protein		3
N-acetylglucosamine-6-sulfatase	GNS	1
N-acetylglucosaminidase, alpha reductase	NAGLU	1
NB6		4
Nerve growth factor	NGF	6
Nerve growth factor receptor	NGFR	6
Neurite inhibitory protein		5
Neurofibromin 1	NF1	6
Neurofibromin 2	NF2	6
Neurofilament protein, NF68	NF68	3
Neurokinin A	NKNA	5
Neurokinin B	NKNB	5
Neuropeptide Y	NPY	5
Neuropeptide Y receptor Y1	NPY1R	5
Neuropeptide Y receptor Y2	NPY2R	5
Nitric oxide synthase 1, NOS1	NOS1	1
Nitric oxide synthase 2, NOS2	NOS2	1
Nitric oxide synthase 3, NOS3	NOS3	1
Notch 3	NOTCH3	6
Notch ligand -jagged 1	JAG 1, AGS	6
Nuclear factor 1-kappa-B-like gene	IKBL	4
Nucleoside diphosphate kinase-A	NDPKA	1
Oncogene bcl2		6
Oncogene sis	PDGFB	6
Ornithine delta-aminotransferase	OAT	1
Ornithine transcarbamoylase	OTC, NME1	1
Orthodenticle (Drosophila) homolog 1	OTX1	6

Orthodenticle (Drosophila) homolog 2	OTX2	6
Patched (Drosophila) homolog, PTCH	PTCH	6
Peroxisomal membrane protein 1	PXMP1	3
Peroxisomal membrane protein 3	PXMP3	2
Peroxisome biogenesis factor 1	PEX1	2
Peroxisome biogenesis factor 19	PEX19	2
Peroxisome biogenesis factor 6	PEX6	2
Peroxisome biogenesis factor 7	PEX7	2
Peroxisome receptor 1	PXR1	2
Persyn		3
Phosphoglucose isomerase	GPI	1
Phosphoglycerate kinase 1	PGK1	1
Phospholipase A2, group 10	PLA2G 10	1
Phospholipase A2, group 1B	PLA2G 1B	4
Phospholipase A2, group 2A	PLA2G2A	4
Phospholipase A2, group 2B	PLA2G2B	4
Phospholipase A2, group 4A	PLA2G4A	4
Phospholipase A2, group 4C	PLA2G4C	4
Phospholipase A2, group 5	PLA2G5	4
Phospholipase A2, group 6	PLA2G6	4
Phospholipase C alpha		4
Phospholipase C beta		4
Phospholipase C delta	PLCD1	4
Phospholipase C epsilon		4
Phospholipase C gamma	PLCG1	4
Phosphomannomutase 2	PMM2	6
Plasminogen	PLG	1
Plasminogen activator inhibitor 1	PAI1	1
Plasminogen activator inhibitor 2	PAI2	1
Plasminogen activator receptor, Urokinase	UPAR; PLAUR	3
Plasminogen activator, Tissue	PLAT; TPA	1
Plasminogen activator, Urokinase	UPAPLAU	1
Platelet derived growth factor	PDGF	6
Platelet derived growth factor receptor	PDGFR	6
Platelet glycoprotein I b, alpha	GP1BA	4
Platelet glycoprotein I b, beta	GP1BB	4
Platelet glycoprotein I b, gamma	GPIBG	4
Platelet glycoprotein IX	GP9	4
Platelet glycoprotein V	GP5	4
Platelet-activating factor acetylhydrolase 2	PAFAH2	4
Platelet-activating factor receptor	PAFR	4
Plectin 1	PLEC1	2
Polycystin 1	PKD1	2
Polycystin 2	PKD2	2
Potassium inwardly-rectifying channel J1	KCNJ1	5
Potassium voltage-gated channel E1	KCNE1	5
Potassium voltage-gated channel Q1	KCNQ1	5

Potassium voltage-gated channel Q2	KCNQ2	5
Potassium voltage-gated channel Q3	KCNQ3	5
POU domain, class 1, transcription factor 1 (Pit1)	POU1F1	6
Prekallikrein		
Prion protein	PRNP	5
Procollagen N-protease		1
Proline dehydrogenase	PRODH	1
Proopiomelanocortin	POMC	5
Prostacyclin synthase		4
Prostaglandin 15-OH dehydrogenase	HGPD, PGDH	4
Prostaglandin D - DP receptor		4
Prostaglandin E1 receptor		4
Prostaglandin E2 receptor		4
Prostaglandin E3 receptor		4
Prostaglandin F - FP receptor		4
Prostaglandin I2 receptor		2
Prostaglandin IP receptor		4
Protective protein for beta-galactosidase	PPGB	1
Protein C	PROC	4
Protein C inhibitor	PCI	4
Protein kinase C, alpha	PRKCA	1
Protein kinase C, gamma	PRKCG	1
Protein kinase G		1
Protein phosphatase 1, regulatory (inhibitor) subunit 3	PPPIR3	1
Protein S	PROS1	4
Prothrombin precursor	F2	4
Purine nucleoside phosphorylase	NP	1
Pyrroline-5-carboxylate synthetase	PYCS	1
Pyruvate carboxylase	PC	1
Ras-G-protein	RAS	6
Renin	REN	1
Replication factor C	RFC2	1
RIGUI	RIGUI	6
S100 calcium-binding protein A1	S100A1	5
S100 calcium-binding protein A4	S100A4	5
S100 calcium-binding protein A5	S100A5	5
S100 calcium-binding protein A6	S100A6	5
S100 calcium-binding protein A7	S100A7	5
S100 calcium-binding protein A9	S100A9	5
S100 calcium-binding protein B	S100B	5
Secretase, alpha		5
Secretase, beta		5
Secretase, gamma		5
Selectin E	SELE	5
Selectin L	SELL	5

Selectin P	SELP	5
Serotonin N-acetyltransferase	SNAT	1
Serotonin receptor, 5HT1A	HTR1A	5
Serotonin receptor, 5HT1B	HTR1B	5
Serotonin receptor, 5HT1C	HTR1C	5
Serotonin receptor, 5HT1 D	HTR1D	5
Serotonin receptor, 5HT1 E	HTR1E	5
Serotonin receptor, 5HT1 F	HTR1F	5
Serotonin receptor, 5HT2A	HTR2A	5
Serotonin receptor, 5HT2B	HTR2B	5
Serotonin receptor, 5HT2C	HTR2C	5
Serotonin receptor, 5HT3	HTR3	5
Serotonin receptor, 5HT4	HTR4	5
Serotonin receptor, 5HT5	HTR5	5
Serotonin receptor, 5HT6	HTR6	5
Serotonin receptor, 5HT7	HTR7	5
Sodium channel, non-voltage gated 1, alpha	SCNN1A	5
Sodium channel, non-voltage gated 1, beta	SCNN1B	5
Sodium channel, non-voltage gated 1, gamma	SCNN1G	5
Sodium channel, voltage-gated, type 1, beta SCN B polypeptide		5
Solute carrier family 1 (glutamate transporter), member 1	SLC1A1	2
Solute carrier family 1 (glutamate transporter), member 2	SLC1A2	2
Solute carrier family 12, member 1	SLC12A1	2
Solute carrier family 12, member 2	SLC12A2	2
Solute carrier family 12, member 3	SLC12A3	2
Solute carrier family 16 (monocarboxylate transporter), member 1	SLC16A1	2
Solute carrier family 16 (monocarboxylate transporter), member 7	SLC16A7	2
Solute carrier family 18, member 3	SLC18A3	2
Solute carrier family 2 (facilitated glucose transporter), member 1	SLC2A1	2
Solute carrier family 20, member 3	SLC20A3	2
Solute carrier family 5 (sodium/glucose transporter), member 1	SLC5A1	2
Solute carrier family 5 (sodium/glucose transporter), member 2	SLC5A2	2
Solute carrier family 5 (sodium/glucose transporter), member 5	SLC5A5	2
Solute carrier family 5, member 3	SLC5A3	2
Solute carrier family 6 (GAMMA-AMINOBTYRIC ACID transporter), member.	SLC6A1	2

Solute carrier family 6 (neurotransmitter transporter, dopamine), member 3	SLC6A3	2
Solute carrier family 6 (neurotransmitter transporter, noradrenaline), member 2	SLC6A2	2
Solute carrier family 6 (neurotransmitter transporter, serotonin), member 4	SLC6A4	2
Solute carrier family 7 (amino acid transporter), member 1	SLC7A1	2
Solute carrier family 7 (amino acid transporter), member 2	SLC7A2	2
Solute carrier family 7 (amino acid transporter), member 7	SLC7A7	2
Sphingomyelinase	SMPD1	1
Spinocerebellar ataxia 8 gene	SCA8	5
Steroid 5 alpha reductase 1	SRD5A1	1
Steroid 5 alpha reductase 2	SRD5A2	1
Substance P		5
Succinic semi-aldehyde dehydrogenase	SSADH	1
Sulfamidase	SGSH	6
Sulfite oxidase	SUOX	1
Superoxide dismutase 1	SOD1	1
Superoxide dismutase 3	SOD3	1
Surfeit 1	SURF1	6
Synapsin 1 a & 1 b	SYN1	5
Synapsin 2a & 2b	SYN2	5
Synaptic vesicle amine transporter	SVAT	5
Synaptobrevin 1	SYB1	5
Synaptobrevin 2	SYB2	5
Synaptogyrin		5
Synaptophysin	SYP	5
Synaptotagmin 1	SYT1	5
Synaptotagmin 2	SYT2	5
Syntaxin 1	STX1	5
Talin	TLN	6
Tau protein	MAPT	3
TEK, tyrosine kinase, endothelial	TEK	1
Telomerase protein component		1
Thrombin receptor	F2R	4
Thrombopoietin	THPO	6
Thromboxane A synthase I	TBXASI	4
Thromboxane A2	TXA2	4
Thromboxane A2 receptor	TBXA2R	4
Thyroxin-binding globulin	TBG	2
Topoisomerase I		1
Transforming growth factor, beta 2	TGFB2	6
Transforming growth factor, beta receptor 2	TGFBR2	6
Tuberous sclerosis 1	TSC1	6

Tuberous sclerosis 2	TSC2	6
Tumour necrosis factor (TNF) receptor associated factor 1	TRAF1	4
Tumour necrosis factor (TNF) receptor associated factor 2	TRAF2	4
Tumour necrosis factor (TNF) receptor associated factor 3	TRAF3	4
Tumour necrosis factor (TNF) receptor associated factor 4	TRAF4	4
Tumour necrosis factor (TNF) receptor associated factor 5	TRAF5	4
Tumour necrosis factor (TNF) receptor associated factor 6	TRAF6	4
Tumour necrosis factor alpha	TNFA	4
Tumour necrosis factor alpha receptor	TNFAR	4
Tumour necrosis factor beta	TNFB	4
Tumour necrosis factor beta receptor	TNFBR	4
Tumour protein p53	TP53,P53	6
Tumour protein p63	TP63	6
Tyrosine aminotransferase	TAT	1
Tyrosine hydroxylase	TH	1
Ubiquitin		6
Ubiquitin B	UBB	6
Ubiquitin C	UBC	6
Ubiquitin carboxyl-terminal esterase L1	UCHL1	6
UDP-glucuronosyltransferase 1	ugt1d, UGT1	1
UDP-glucuronosyltransferase 2	UGT2	1
Undulin 1	COL14A1	3
Uridinediphosphate(UDP)-galactose-4-epimerase	GALE	1
Uroporphyrinogen III synthase	UROS	1
Vacuolar proton pump, subunit 1	VPP1	5
Vacuolar proton pump, subunit 3	VPP3	5
Vasoactive intestinal polypeptide	VIP	5
Vasoactive intestinal polypeptide receptor	VIPR	5
Von Hippel-Lindau gene	VHL	6
Wolf-Hirschhorn syndrome candidate 1 gene	WHSC1	6
Xanthine dehydrogenase	XDH	1
Zinc finger protein 2	ZIC2	3,

## Legende für die Spalte Proteinfunktion:

1	Enzym	2	Transport und Lagerung
3	Struktur	4	Immunität
5	Nervale Transmission	6	Wachstum und Differenzierung



**Tabelle 6**  
**Demenz**

<b>Liste der Gene</b>	<b>HUGO Gensymbol</b>	<b>Protein- funktion</b>
2,3-Bisphosphoglycerate mutase	BPGM	1
3 beta Hydroxysteroid dehydrogenase 2	HSD3B2	1
5,10-Methylenetetrahydrofolate reductase (NADPH)	MTHFR	1
Acetylcholine receptor, nicotinic, alpha A1	CHRNA1	5
Acetylcholine receptor, nicotinic, alpha A2	CHRNA2	5
Acetylcholine receptor, nicotinic, alpha A3	CHRNA3	5
Acetylcholine receptor, nicotinic, alpha A4	CHRNA4	5
Acetylcholine receptor, nicotinic, alpha A5	CHRNA5	5
Acetylcholine receptor, nicotinic, alpha A6	CHRNA6	5
Acetylcholine receptor, nicotinic, alpha A7	CHRNA7	5
Acetylcholine receptor, nicotinic, beta 1	CHRNA1	5
Acetylcholine receptor, nicotinic, beta 2	CHRNA2	5
Acetylcholine receptor, nicotinic, beta 3	CHRNA3	5
Acetylcholine receptor, nicotinic, beta 4	CHRNA4	5
Acetylcholine receptor, nicotinic, epsilon	CHRNA5	5
Acetylcholine receptor, nicotinic, gamma	CHRNA6	5
Acetylcholinesterase	ACHE	1
Adducin, alpha	ADD1	3
Adducin, beta	ADD2	3
Adenosine receptor A1	ADORA1	5
Adenosine receptor A2A	ADORA2A	5
Adenosine receptor A2B	ADORA2B	5
Adenosine receptor A3	ADORA3	5
Adenylate cyclase 1	ADCY1	1
Adenylate cyclase 2	ADCY2	1
Adenylate cyclase 3	AOCY3	1
Adenylate cyclase 4	ADCY4	1
Adenylate cyclase 5	ADCY5	1
Adenylate cyclase 6	ADCY6	1
Adenylate cyclase 7	ADCY7	1
Adenylate cyclase 8	ADCY8	1
Adenylate cyclase 9	ADCY9	1
Adrenergic receptor, alpha1	ADRA1	5
Adrenergic receptor, alpha2	ADRA2	5
Adrenergic receptor, beta1	ADRB1	5
Adrenergic receptor, beta2	ADRB2	5
Adrenergic receptor, beta3	ADRB3	5
Adrenocorticotrophic hormone (ACTH) receptor	ACTHR	6
Albumin, ALB	ALB	2

Aldosterone receptor	MLR	6
alpha 2 Macroglobulin	A2M	4
alpha1-Antitrypsin	PI	1
alpha2-Antiplasmin	PLI	1
alpha-Synuclein	SNCA	5
Aminopeptidase P	XPNPEP2	1
Amyloid beta (A4) precursor protein-binding, APBB1	APBB1	5
Amyloid beta A4 precursor protein	APP	5
Amyloid beta A4 precursor-like protein	APLP	5
Angiopoietin 1	ANGPT1	6
Angiopoietin 2	ANGPT2	6
Angiotensin converting enzyme	ACE,DCP1	1
Angiotensin receptor 1	AGTR1	2
Angiotensin receptor 2	AGTR2	2
Angiotensinogen	AGT	1
Antidiuretic hormone receptor	ADHR	2
Antithrombin III	AT3	1
Apolipoprotein A 1	APOA1	2
Apolipoprotein A 1	APOA2	2
Apolipoprotein B	APOB	2
Apolipoprotein C1	APOC1	2
Apolipoprotein C2	APOC2	2
Apolipoprotein C3	APOC3	2
Apolipoprotein D	APOD	2
Apolipoprotein E	APOE	2
Apolipoprotein H	APOH	2
Apoptosis antigen 1	APT1	4
Arginase	ARG1	1
Arginine vasopressin	AVP	5
Arginine vasopressin receptor 1A	AVPR1A	5
Arginine vasopressin receptor 1B	AVPR1B	5
Arginine vasopressin receptor 2	AVPR2	5
Arginosuccinate lyase	ASL	1
Arginosuccinate synthetase	ASS	1
Ataxia telangiectasia gene, AT	ATM	6
ATP/ADP translocase		1
Atrial natriuretic peptide	ANP	6
Atrial natriuretic peptide receptor A	NPR1	6
Atrial natriuretic peptide receptor B	NPR2	6
Atrial natriuretic peptide receptor C	NPR3	6
Bagpipe homeobox, drosophila homolog of, 1	BAPX1	6
beta-synuclein	SNCB	5
Bleomycin hydrolase	BLMH	1
Bradykinin receptor B1		4
Bradykinin receptor B2		4
Brain derived neurotrophic factor	BDNF	6

Brain derived neurotrophic factor (BDNF) receptor	BDNFR	6
Butyrylcholinesterase	BCHE	1
Cadherin E	CDH1	6
Cadherin EP		6
Cadherin N	CDH2	6
Cadherin P	CDH3	6
Calbindin 1	CALB1	6
Calbindin D9K	CALB3	6
Calcineurin A1	CALNA1	4
Calcineurin A2	CALNA2	4
Calcineurin A3	CALNA3	4
Calcineurin B		
Calcitonin/Calcitonin gene-related peptide alpha	CALCA	5
Calcium channel, voltage-dependent, alpha 1 F subunit	CACNA1F	5
Calcium channel, voltage-dependent, Alpha-1B (CACNL1A5)	CACNA1B	5
Calcium channel, voltage-dependent, Alpha-1 C	CACNA1C	5
Calcium channel, voltage-dependent, Alpha-1 D	CACNA1D	5
Calcium channel, voltage-dependent, Alpha-1 E (CACNL1A6)	CACNA1E	5
Calcium channel, voltage-dependent, Alpha-2/delta	CACNA2	5
Calcium channel, voltage-dependent, Beta 1	CACNB1	5
Calcium channel, voltage-dependent, Beta 3	CACNB3	5
Calcium channel, voltage-dependent, L type, alpha 1S subunit	CACNAL S	5
Calcium channel, voltage-dependent, Neuronal, Gamma	CACNG2	5
Calcium channel, voltage-dependent, P/Q type, alpha 1A subunit	CACNA1A	5
Calcium channel, voltage-dependent, T-type		5
Calmodulin 1	CALM1	6
Calmodulin 2	CALM2	6
Calmodulin 3	CALM3	6
Calmodulin-dependant protein kinase II	CAMK2A	6
Calnexin	CANX	6
Calpain	CAPN,CAPN3	1
Calretinin	CALB2	5
Carbonic anhydrase 3	CA3	1
Carbonic anhydrase 4	CA4	1
Carbonic anhydrase, alpha	CA1	1
Carbonic anhydrase, beta	CA2	1
Cardiac-specific homeobox, CSX	CSX	6
Caspase 1	CASP1	6

Caspase 10	CASP10	6
Caspase 2	CASP2	6
Caspase 3	CASP3	6
Caspase 4	CASP4	6
Caspase 5	CASP5	6
Caspase 6	CASP6	6
Caspase 7	CASP7	6
Caspase 8	CASP8	6
Caspase 9	CASP9	6
Catechol-o-methyltransferase	COMT	1
CD1	CD1	
CD4	CD4	
Cell adhesion molecule, intercellular, ICAM	ICAM1	6
Cell adhesion molecule, leukocyte-endothelial, LECAM (CD62)	LECAM1	6
Cell adhesion molecule, liver, LCAM	LCAM	6
Cell adhesion molecule, neural, NCAM1	NCAM1	6
Cell adhesion molecule, neural, NCAM2	NCAM2	6
Cell adhesion molecule, platelet-endothelial, PECAM	PECAM1	6
Cell adhesion molecule, vascular, VCAM	VCAM1	6
Chemokine receptor CXCR4	CXCR4	4
Choline acetyltransferase	CHAT	1
Chymotrypsinogen		1
Cockayne syndrome gene, CKN1	CKN1	6
Cofilin		3
Collagen I alpha 1	COL1A1	3
Collagen I alpha 2	COL1A2	3
Collagen II alpha 1	COL2A1	3
Collagen III alpha 1	COL3A1	3
Collagen IV alpha 1	COL4A1	3
Collagen IV alpha 2	COL4A2	3
Collagen IV alpha 3	COL4A3	3
Collagen IV alpha 4	COL4A4	3
Collagen IV alpha 5	COL4A5	3
Collagen IV alpha 6	COL4A6	3
Collagen IX alpha 2	COL9A2, EDM2	3
Collagen IX alpha 3	COL9A3	3
Collagen receptor	COLR	3
Collagen V alpha 1	COL5A1	3
Collagen V alpha 2	COL5A2	3
Collagen VI alpha 1	COL6A1	3
Collagen VI alpha 2	COL6A2	3
Collagen VI alpha 3	COL6A3	3
Collagen VII alpha 1	COL7A1	3
Collagen X alpha 1	COL10A1	3
Collagen X alpha 1	COL11A1	3

Collagen XI alpha 2	COL11A2	3
Collagen XVII alpha 1	COL17A1	3
Corticotrophin releasing hormone	CRH	2
Corticotrophin releasing hormone receptor	CRHR1	2
Cu <sup>2+</sup> transporting ATPase beta polypeptide	ATP7B	1
Cyclic AMP-dependent protein kinase	PKA	1
Cyclic nucleotide phosphodiesterase 2A3	PDE2A3	1
Cyclic nucleotide phosphodiesterase 3A	PDE3A	1
Cyclic nucleotide phosphodiesterase 3B	PDE3B	1
Cyclic nucleotide phosphodiesterase 4A	PDE4A	1
Cyclic nucleotide phosphodiesterase 4C	PDE4C	1
Cyclic nucleotide phosphodiesterase 5A	PDE5A	1
Cyclic nucleotide phosphodiesterase 6A	PDE6A	1
Cyclic nucleotide phosphodiesterase 6B	PDE6B	1
Cyclic nucleotide phosphodiesterase 7	PDE7	1
Cyclic nucleotide phosphodiesterase 8	PDE8	1
Cyclic nucleotide phosphodiesterase 9A	PDE9A	1
Cyclooxygenase 1	COX1	1
Cyclooxygenase 2	COX2	1
CYP11A1	CYP11A1	1
CYP11B1	CYP11B1	1
CYP11B2	CYP11B2	1
CYP17	CYP17	1
CYP19	CYP19	1
CYP1A1	CYP1A1	1
CYP1A2	CYP1A2	1
CYP1B1	CYP1B1	1
CYP21	CYP21	1
CYP24	CYP24	1
CYP27	CYP27	1
CYP27B1	PDDR	1
CYP2A1	CYP2A1	1
CYP2A13	CYP2A13	1
CYP2A3	CYP2A3	1
CYP2A6V2	CYP2A6V2	1
CYP2A7	CYP2A7	1
CYP2B6	CYP2B6	1
CYP2C18	CYP2C18	1
CYP2C19	CYP2C19	1
CYP2C8	CYP2C8	1
CYP2C9	CYP2C9	1
CYP2D6	CYP2D6	1
CYP2E1	CYP2E1	1
CYP2F1	CYP2F1	1
CYP2J2	CYP2J2	1
CYP3A3	CYP3A3	1
CYP3A4	CYP3A4	1

CYP3A5	CYP3A5	1
CYP3A7	CYP3A7	1
CYP4A11	CYP4A11	1
CYP4B1	CYP4B1	1
CYP4F2	CYP4F2	1
CYP4F3	CYP4F3	1
CYP51	CYP51	1
CYP5A1	CYP5A1	1
CYP7A	CYP7A	1
CYP8	CYP8	1
Cystathione beta synthase	CBS	1
Cystatin C	CST3	2
Cystinosin	CTNS	2
Cytidine-5-prime-triphosphate synthetase	CTPS	1
Cytochrome a		1
Cytochrome c		1
Cytochrome c oxidase, MTCO		1
Dihydrolipoyl succinyltransferase	DLST	1
Dopamine beta hydroxylase	DBH	1
Dopamine receptors D1	DRD1	5
Dopamine receptors D2	DRD2	5
Dopamine receptors D3	DRD3	5
Dopamine receptors D4	DRD4	5
Dopamine receptors D5	DRD5	5
Doublecortin, DCX	DCX	3
Emerin	EMD	2
Endothelin 1	DNI	5
Endothelin 2	EDN2	5
Endothelin 3	EDN3	5
Endothelin converting enzyme	ECE1	5
Endothelin receptor type A	EDNRA	5
Endothelin receptor type B	EDNRB	5
Enolase	ENO1	1
Epidermal growth factor	EGF	6
Epidermal growth factor receptor	EGFR	6
Epilepsy, progressive myoclonic 2 gene	EPM2A	1
Excision repair complementation group 4 protein	ERCC4	1
Factor I (No. one)	F1	4
Factor III	F3	4
Factor IX	F9	4
Factor V	F5	4
Factor VII	F7	4
Factor VIII	F8	4
Factor X	F10	4
Factor XI	F11	4
Factor XII	F12	4

Factor XIII A & B	F13A & F13B	4
Fanconi anemia, complementation group A	FANCA	2
Fibrinogen alpha	FGA	3
Fibrinogen beta	FGB	3
Fibrinogen gamma	FGG	3
Fibroblast growth factor	FGFI	6
Fibroblast growth factor receptor 1	FGFRL	6
Fibroblast growth factor receptor 2	FGFR2	6
Fibroblast growth factor receptor 3	FGFR3	6
Fibronectin precursor	FN1	6
Follicle stimulating hormone receptor	FSHR,ODG1	6
Follicle stimulating hormone, FSH	FSHB	6
GABA receptor, alpha 1	GABRA1	5
GABA receptor, alpha 2	GABRA2	5
GABA receptor, alpha 3	GABRA3	5
GABA receptor, alpha 4	GABRA4	5
GABA receptor, alpha 5	GABRA5	5
GABA receptor, alpha 6	GABRA6	5
GABA receptor, beta 1	GABRB1	5
GABA receptor, beta 2	GABRB2	5
GABA receptor, beta 3	GABRB3	5
GABA receptor, gamma 1	GABRG1	5
GABA receptor, gamma 2	GABRG2	5
GABA receptor, gamma 3	GABRG3	5
GABA transaminase	ABAT	1
Galactosyltransferase 1	GT1	6
Galactosyltransferase, alpha 1,3	GGTA1	6
Galactosyltransferase, beta 3	B3GALT	6
Gastric Intrinsic factor, GIF	GIF	1
Glial-cell derived neurotrophic factor (GDNF) receptor		5
Glial-cell derived neurotrophic factor, GDNF	GDNF	5
Glutamate decarboxylase, GAD	GAD1	1
Glutamate receptor 1	GLUR1	5
Glutamate receptor 2	GLUR2	5
Glutamate receptor 3	GLUR3	5
Glutamate receptor 4	GLUR4	5
Glutamate receptor 5	GLUR5	5
Glutamate receptor 6	GLUR6	5
Glutamate receptor 7	GLUR7	5
Glutamate receptor, ionotropic, NMDA 1	NMDAR1	5
Glutamate receptor, ionotropic, NMDA 2A	NMDAR2A	5
Glutamate receptor, ionotropic, NMDA 2B	NMDAR2B	5
Glutamate receptor, ionotropic, NMDA 2C	NMDAR2C	5
Glutamate receptor, ionotropic, NMDA 2D	NMDAR2D	5
Glutaryl-CoA dehydrogenase	GCDH	1
Glutathione	GSH	2

Glutathione S-transferase, GSTZ1	GSTZ1	1
Glyceraldehyde-3-phosphate dehydrogenase, GAPDH	GAPDH	1
Glycerol kinase	GK	1
Glycinamide ribonucleotide (GAR) transformylase	GART	1
Gonadotropin releasing hormone receptor	GNRHR	6
Guanylyl cyclase		1
Haemoglobin alpha 1	HBAL	2
Haemoglobin alpha 2	HBA2	2
Haemoglobin beta	HBB	2
Haemoglobin delta	HBD	2
Haemoglobin gamma A	HBGL	2
Haemoglobin gamma B	HBG2	2
Haemoglobin gamma G	HBGG	2
Heparan sulfamidase		1
Heparin binding epidermal growth factor	HBEGF	6
Heparin Cofactor II	HCF2	4
Hepatic lipase	LIPC	1
Hexosaminidase A	HEXA,TSD	1
Hexosaminidase B	HEXB	1
Hippocampal cholinergic neurostimulating peptide, HCNP		5
Histamine receptors, H1		5
Histamine receptors, H2		5
Histamine receptors, H3		5
Histidase		1
HLA-B associated transcript 1	BAT1	
HMG-CoA reductase	HMGCR	1
Holocarboxylase synthetase	HLCS	1
Hypoxia inducible factor 1	HIF1A	1
Hypoxia inducible factor 2		1
IC7 A and B		4
Inositol monophosphatase	IMPA1	5
Insulin	INS	6
Insulin receptor	INSR	6
Integrin beta 1	ITGB1	6
Integrin beta 2	ITGB2	6
Integrin beta 3	ITGB3	6
Integrin beta 4	ITGB4	6
Integrin beta 5	ITGB5	6
Integrin beta 6	ITGB6	6
Integrin beta 7	ITGB7	6
Integrin, alpha 1	ITGA1	6
Integrin, alpha 2	ITGA2	6
Integrin, alpha 3	ITGA3	6
Integrin, alpha 4	ITGA4	6
Integrin, alpha 5	ITGA5	6



Integrin, alpha 6	ITGA6	6
Integrin, alpha 7	ITGA7	6
Integrin, alpha 8	ITGA8	6
Integrin, alpha 9	ITGA9	6
Integrin, alpha M	ITGAM	6
Integrin, alpha,X	ITGAX	6
Interleukin(IL) 1 receptor	IL1R	4
Interleukin(IL) 1, alpha	IL1A	4
Interleukin(IL) 1, beta	IL1B	4
Interleukin(IL) 10	IL10	4
Interleukin(IL) 10 receptor	IL10R	4
Interleukin(IL) II	IL11	4
Interleukin(IL) I 1 receptor	IL11R	4
Interleukin(IL) 12	IL12	4
Interleukin(IL) 12 receptor, beta 1	IL12RB1	4
Interleukin(IL) 13	IL13	4
Interleukin(IL) 13 receptor	IL13R	4
Interleukin(IL) 2	IL2	4
Interleukin(IL) 2 receptor, alpha	IL2RA	4
Interleukin(IL) 2 receptor, gamma	IL2RG	4
Interleukin(IL) 3	IL3	4
Interleukin(IL) 3 receptor	IL3R	4
Interleukin(IL) 4	IL4	4
Interleukin(IL) 4 receptor	IL4R	4
Interleukin(IL) 5	IL5	4
Interleukin(IL) 5 receptor	IL5R	4
Interleukin(IL) 6	IL6	4
Interleukin(IL) 6 receptor	IL6R	4
Interleukin(IL) 7	IL7	4
Interleukin(IL) 7 receptor	IL7R	4
Interleukin(IL) 8	IL8	4
Interleukin(IL) 8 receptor	IL8R	4
Interleukin(IL) 9	IL9	4
Interleukin(IL) 9 receptor	IL9R	4
Interleukin(IL) receptor antagonist 1	IL1 RN, IL1RA	4
IP3 kinase		1
Kallikrein 3	KAK3	4
Kininogen, High molecular weight	KNG	4
Kynureninease		1
Laminin 5, alpha 3	LAMA3	6
Laminin 5, beta 3	LAMB3	6
Laminin 5, gamma 2	LAMC2	6
Laminin M	LAMM	6
Laminin receptor 1	LAMR1	6
Latent transforming growth factor-beta binding protein 2	LTBP2	6
Leptin	LEP	6

Leptin receptor	LEPR	6
Leukin		4
Leukocyte-specific transcript 1	LST-1	4
Leukotriene A4 hydrolase		4
Leukotriene A4 synthase	LTA4S	1
Leukotriene B4 receptor		4
Leukotriene B4 synthase	LTB4S	1
Leukotriene C4 receptor		4
Leukotriene C4 synthase	LTC4S	1
Leukotriene D4/E4 receptor		4
LIM homeobox protein 1	LHX1	6
LIM-Kinase I (LINK-1)		4
Lipoprotein receptor, Low Density	LDLR	2
Lipoprotein, High Density	HDLDT1	2
Lipoprotein, Intermediate Density		2
Lipoprotein, Low Density I		2
Lipoprotein, Low Density 2		2
Lipoprotein, Very Low Density	VLDLR	2
Low density lipoprotein receptor-related protein precursor	LRP	2
Lymphoid enhancer-binding factor	LEF-1	6
MAD (mothers against decapentaplegic, Drosophila) homologue 4	MADH4	6
Mannosidase, alpha B lysosomal	MANB	1
Mannosidase, beta A lysosomal	MANBA	1
Methionine synthase	MTR	1
Mismatch repair gene, PMSL2	PMS2	6
Molybdenum cofactor synthesis 1	MOSC1	1
Molybdenum cofactor synthesis 2	MOCS2	1
Monoamine oxidase A	MAOA	1
Monoamine oxidase B	MAOB	1
Muscarinic receptor, M1	CHRM1	5
Muscadnic receptor, M2	CHRM2	5
Muscarinic receptor, M3	CHRM3	5
Muscarinic receptor, M4	CHRM4	5
Muscarinic receptor, M5	CHRM5	5
Myelin basic protein		3
N-Acetylglucosamine-6-sulfatase	GNS	1
N-Acetylglucosaminidase, alpha reductase NB6	NAGLU	1
Nerve growth factor	NGF	6
Nerve growth factor receptor	NGFR	6
Neurite inhibitory protein		5
Neuroendocrine convertase 1	NEC1, PCSK1	1
Neurofibromin 1	NF1	6
Neurofibromin 2	NF2	6
Neurofilament protein, NF68	NF68	3
Neurokinin A	NKNA	5

Neurokinin B	NKKB	5
Neuropeptide Y	NPY	5
Neuropeptide Y receptor Y1	NPY1R	5
Neuropeptide Y receptor Y2	NPY2R	5
Nitric oxide synthase 1, NOS1	NOS1	1
Nitric oxide synthase 2, NOS2	NOS2	1
Nitric oxide synthase 3, NOS3	NOS3	1
Notch 3	NOTCH3	6
Nuclear factor 1-kappa-B-like gene	IKB1	4
Nucleoside diphosphate kinase-A	NDPKA	1
Oncogene bcl2		6
Oncogene sis	PDGFB	6
Omithine delta-aminotransferase	OAT	1
Omithine transcarbamoylase	OTC, NME1	1
Parkin	PARK2	5
Persyn		3
Phosphoglucose isomerase	GPI	1
Phosphoglycerate kinase 1	PGK1	1
Phospholipase A2, group 10	PLA2G 10	4
Phospholipase A2, group 1B	PLA2G1B	4
Phospholipase A2, group 2A	PLA2G2A	4
Phospholipase A2, group 2B	PLA2G2B	4
Phospholipase A2, group 4A	PLA2G4A	4
Phospholipase A2, group 4C	PLA2G4C	4
Phospholipase A2, group 5	PLA2G5	4
Phospholipase A2, group 6	PLA2G6	4
Phospholipase C alpha		4
Phospholipase C beta		4
Phospholipase C delta	PLCD1	4
Phospholipase C epsilon		4
Phospholipase C gamma	PLCG1	4
Plasminogen	PLG	1
Plasminogen activator inhibitor 1	PAI1	1
Plasminogen activator inhibitor 2	PAI2	1
Plasminogen activator receptor, Urokinase	UPAR; PLAUR	3
Plasminogen activator, Tissue	PLAT; TPA	1
Plasminogen activator, Urokinase	UPA; PLAU	1
Platelet derived growth factor	PDGF	6
Platelet derived growth factor receptor	PDGFR	6
Platelet-activating factor receptor	PAFR	4
Postsynaptic density-95 protein	PSD95	5
Potassium inwardly-rectifying channel J1	KCNJ1	5
Potassium voltage-gated channel E1	KCNE1	5
Potassium voltage-gated channel Q1	KCNQ1	5
POU domain, class 1, transcription factor 1 (Pit1)	POU1F1	6
Prekallikrein		
Presenilin 1	PSEN1	2

Presenilin 2	PSEN2	2
Prion protein	PRNP	5
Procoliagen N-protease		1
Proopiomelanocortin	POMC	5
Prostacyclin synthase		4
Prostaglandin 15-OH dehydrogenase	HGPD;PGDH	4
Prostaglandin D - DP receptor		4
Prostaglandin E1 receptor		4
Prostaglandin E2 receptor		4
Prostaglandin E3 receptor		4
Prostaglandin F - FP receptor		4
Prostaglandin 12 receptor		2
Prostaglandin IP receptor		4
Protective protein for beta-galactosidase	PPGB	1
Protein C	PROC	4
Protein C inhibitor	PCI	4
Protein kinase C, alpha	PRKCA	1
Protein kinase C, gamma	PRKCG	1
Protein kinase G		1
Protein phosphatase 1, regulatory (inhibitor) subunit 3	PPP1R3	1
Protein S	PROS1	4
Prothrombin precursor	F2	4
Purine nucleoside phosphorylase	NP	1
Pyruvate carboxylase	PC	1
Renin	REN	1
Replication factor C	RFC2	1
RIGUI	RIGUI	6
S100 calcium-binding protein A3	S 100A3	5
S100 calcium-binding protein A4	S 100A4	5
S100 calcium-binding protein A5	S 100A5	5
S100 calcium-binding protein A7	S 100A7	5
S100 calcium-binding protein A8.	S 100A8	5
S100 calcium-binding protein B	S 100B	5
S100 calcium-binding protein P	S 100P	5
Secretase, alpha		5
Secretase, beta		5
Secretase, gamma		5
Selectin E	SELE	5
Selectin L	SELL	5
Selectin P	SELP	5
Serotonin N-acetyltransferase	SNAT	1
Serotonin receptor, 5HT1A	HTR1A	5
Serotonin receptor, 5HT1B	HTR1B	5
Serotonin receptor, 5HT1C	HTR1C	5
Serotonin receptor, 5HT1D	HTR1D	5
Serotonin receptor, 5HT1E	HTR1E	5

Serotonin receptor, 5HT1F	HTR1F	5
Serotonin receptor, 5HT2A	HTR2A	5
Serotonin receptor, 5HT2B	HTR2B	5
Serotonin receptor, 5HT2C	HTR2C	5
Serotonin receptor, 5HT3	HTR3	5
Serotonin receptor, 5HT4	HTR4	5
Serotonin receptor, 5HT5	HTR5	5
Serotonin receptor, 5HT6	HTR6	5
Serotonin receptor, 5HT7	HTR7	5
Sodium channel, non-voltage gated 1, alpha	SCNN1A	5
Sodium channel, non-voltage gated 1, beta	SCNN1B	5
Sodium channel, non-voltage gated 1, gamma	SCNN1G	5
Sodium channel, voltage-gated, type 1, beta polypeptide	SCN1B	5
Solute carrier family 1 (glutamate transporter), member 1	SLC1A1	2
Solute carrier family 1 (glutamate transporter), member 2	SLC1A2	2
Solute carrier family 12, member 1	SLC12A1	2
Solute carrier family 12, member 2	SLC12A2	2
Solute carrier family 12, member 3	SLC12A3	2
Solute carrier family 8, member 3	SLC18A3	2
Solute carrier family 5 (sodium/glucose transporter), member 1	SLC5A1	2
Solute carrier family 5 (sodium/glucose transporter), member 2	SLC5A2	2
Solute carrier family 5 (sodium/glucose transporter), member 5	SLC5A5	2
Solute carrier family 5 member 3	SLC5A3	2
Solute carrier family 6 (GAMMA-AMINO BUTYRIC ACID transporter), member 1	SLC6A	2
Solute carrier family 6 (neurotransmitter transporter, dopamine), member 3	SLC6A3	2
Solute carrier family 6 (neurotransmitter transporter, noradrenaline), member 2	SLC6A2	2
Solute carrier family 6 (neurotransmitter transporter, serotonin), member 4	SLC6A4	2
Sphingomyelinase	SMPD1	1
Substance P		5
Succinic semi-aldehyde dehydrogenase	SSADH	1
Sulfite oxidase	SUOX	1
Superoxide dismutase 1	SOD1	1
Superoxide dismutase 3	SOD3	1
Surfeit 1	SURF1	6
Synaptogyrin		5
Synaptophysin	SYP	5
Syntaxin 1	STXI	5

Talin	TLN	6
Tau protein	MAPT	3
TEK, tyrosine kinase, endothelial	TEK	1
Telomerase protein component		1
Thrombin receptor	F2R	4
Thrombopoietin	THPO	6
Thromboxane A synthase 1	TBXAS1	4
Topoisomerase 1		1
Transforming growth factor, beta 2	TGFB2	6
Transforming growth factor, beta receptor 2	TGFB2	6
Tumour necrosis factor (TNF) receptor associated factor 1	TRAF1	4
Tumour necrosis factor (TNF) receptor associated factor 2	TRAF2	4
Tumour necrosis factor (TNF) receptor associated factor 3	TRAF3	4
Tumour necrosis factor (TNF) receptor associated factor 4	TRAF4	4
Tumour necrosis factor (TNF) receptor associated factor 5	TRAF5	4
Tumour necrosis factor (TNF) receptor associated factor 6	TRAF6	4
Tumour necrosis factor alpha	TNFA	4
Tumour necrosis factor alpha receptor	TNFAR	4
Tumour necrosis factor beta	TNFB	4
Tumour necrosis factor beta receptor	TNFB2	4
Tumour protein p53	TP53,P53	6
Tumour protein p63	TP63	6
Tyrosine aminotransferase	TAT	1
Tyrosine hydroxylase	TH	1
Ubiquitin		66
Ubiquitin B	UBB	6
Ubiquitin C	UBC	6
Ubiquitin carboxyl-terminal esterase L1	UCHL1	6
UDP-glucuronosyltransferase 1	ugt1d, UGT1	1
UDP-glucuronosyltransferase 2	UGT2	1
Uridinediphosphate(UDP)-galactose-4-epimerase	GALE	1
Uroporphyrinogen III -synthase	UROS	1
Vacuolar proton pump, subunit 1	VPP1	5
Vacuolar proton pump, subunit 3	VPP3	5
Vasoactive intestinal polypeptide	VIP	5
Vasoactive intestinal polypeptide receptor	VIPR	5
Xanthine dehydrogenase	XDH	1

## Legende für die Spalte Proteinfunktion:

1	Enzym	2	Transport und Lagerung
3	Struktur	4	Immunität
5	Nervale Transmission	6	Wachstum und Differenzierung

**Tabelle 7**  
**psychotische Störungen und Persönlichkeitsstörungen**

Liste der Gene	HUGO Gensymbol	Protein- funktion
11 beta hydroxysteroid dehydrogenase 2	HSD11B2	1
5,10-methylenetetrahydrofolate reductase (NADPH)	MTHFR	1
Acetylcholine receptor, nicotinic, alpha A1	CHRNA1	5
Acetylcholine receptor, nicotinic, alpha A2	CHRNA2	5
Acetylcholine receptor, nicotinic, alpha A3	CHRNA3	5
Acetylcholine receptor, nicotinic, alpha A4	CHRNA4	5
Acetylcholine receptor, nicotinic, alpha A5	CHRNA5	5
Acetylcholine receptor, nicotinic, alpha A6	CHRNA6	5
Acetylcholine receptor, nicotinic, alpha A7	CHRNA7	5
Acetylcholine receptor, nicotinic, beta 1	CHRNA1	5
Acetylcholine receptor, nicotinic, beta 2	CHRNA2	5
Acetylcholine receptor, nicotinic, beta 3	CHRNA3	5
Acetylcholine receptor, nicotinic, beta 4	CHRNA4	5
Acetylcholine receptor, nicotinic, epsilon	CHRNE	5
Acetylcholine receptor, nicotinic, gamma	CHRNA7	5
Acetylcholinesterase	ACHE	1
Adenosine receptor A1	ADORA1	5
Adenosine receptor A2A	ADORA2A	5
Adenosine receptor A2B	ADO 2B	5
Adenosine receptor A3	ADORA3	5
Adenylate cyclase 1	ADCY1	1
Adenylate cyclase 2	ADCY2	1
Adenylate cyclase 3	ADCY3	1
Adenylate cyclase 4	ADCY4	1
Adenylate cyclase 5	ADCY5	1
Adenylate cyclase 6	ADCY6	1
Adenylate cyclase 7	ADCY7	1
Adenylate cyclase 8	ADCY8	1
Adenylate cyclase 9	ADCY9	1
Adenylosuccinate lyase	ADSL	1
Adrenergic receptor, alpha1	ADRA1	5
Adrenergic receptor, alpha2	ADRA2	5
Adrenergic receptor, beta1	ADRB1	5
Adrenergic receptor, beta2	ADRB2	5
Adrenergic receptor, beta3	ADRB3	5
Adrenocorticotrophic hormone (ACTH) receptor	ACTHR	6
Albumin, ALB	ALB	2
alpha 1-antichymotrypsin	AACT	1
alpha-synuclein	SNCA	5



Amyloid beta A4 precursor protein	APP	5
Amyloid beta A4 precursor-like protein	APLP	5
Apolipoprotein A I	APOA1	2
Apolipoprotein A II	APOA2	2
Apolipoprotein B	APOB	2
Apolipoprotein C1	APOC1	2
Apolipoprotein C2	APOC2	2
Apolipoprotein C3	APOC3	2
Apolipoprotein D	APOD	2
Apolipoprotein E	APOE	2
Apolipoprotein H	APOH	2
Arginosuccinate synthetase	ASS	1
Arylsulfatase A	ARSA	1
Ataxia telangiectasia gene, AT	ATM	6
ATP/ADP translocase		1
Atrial natriuretic peptide	ANP	6
Atrial natriuretic peptide receptor A	NPR1	6
Atrial natriuretic peptide receptor B	NPR2	6
Atrial natriuretic peptide receptor C	NPR3	6
Bagpipe homeobox, drosophila homolog of, 1	BAPX1	6
beta-synuclein	SNCB	5
Brain derived neurotrophic factor	BDNF	6
Brain derived neurotrophic factor (BDNF) receptor	BDNFR	6
C1 inhibitor		1
Ca(2+) transporting ATPase, slow twitch albindin	ATP2A2	2
Calbindin D9K	CALB1	6
Calcineurin A1	CALB3	6
Calcineurin A2	CALNA1	4
Calcineurin A3	CALNA2	4
Calcineurin B	CALNA3	4
Calcitonin/Calcitonin gene-related peptide alpha	CALCA	5
Calcium channel, voltage-dependent, alpha 1 F subunit	CACNA 1F	5
Calcium channel, voltage-dependent, Alpha- I B (CACNL1A5)	CACNA 1B	5
Calcium channel, voltage-dependent, Alpha- I C	CACNA 1C	5
Calcium channel, voltage-dependent, Alpha- 1 D	CACNA 1D	5
Calcium channel, voltage-dependent, Alpha- I E (CACNL1A6)	CACNA 1E	5
Calcium channel, voltage-dependent, Alpha- 2/delta	CACNA2	5
Calcium channel, voltage-dependent, Beta 1	CACNB1	5
Calcium channel, voltage-dependent, Beta 3	CACNB3	5

Calcium channel, voltage-dependent, Neuronal, Gamma	CACNG2	5
Calcium channel, voltage-dependent, T-type		5
Calmodulin 1	CALM1	6
Calmodulin 2	CALM2	6
Calmodulin 3	CALM3	6
Calmodulin-dependant protein kinase II	CAMK2A	6
Calnexin	CANX	6
Calpain	CAPN, CAPN3	1
Calretinin	CALB2	5
Cannabinoid receptor	CNR1	5
Carbonic anhydrase 3	CA3	1
Carbonic anhydrase 4	CA4	1
Carbonic anhydrase, alpha	CA1	1
Carbonic anhydrase, beta	CA2	1
Cardiac-specific homeobox, CSX	CSX	6
Caspase 1	CASP1	6
Catechol-o-methyltransferase	COMT	1
Ceroid lipofuscinosis neuronal 2	CLN2	5
Ceroid lipofuscinosis neuronal 3	CLN3	5
Ceroid lipofuscinosis neuronal 4	CLN4	5
Ceroid lipofuscinosis neuronal 5	CLN5	5
Ceroid lipofuscinosis neuronal 6	CLN6	5
Chemokine receptor CCR5	CCR5	4
Chemokine receptor CXCR4	CXCR4	4
Cholecystokinin	CCK	5
Cholecystokinin B receptor	CCKBR	5
Choline acetyltransferase	CHAT	1
Chymotrypsinogen		1
Ciliary neurotrophic factor (CNTF)	CNTF	6
Ciliary neurotrophic factor (CNTF) receptor	CNTFR	6
Citrate synthase		1
Colony-stimulating factor 2	CSF2	6
Colony-stimulating factor 2 alpha receptor	CSF2RA	6
Corticotrophin-releasing hormone	CRH	2
Corticotrophin-releasing hormone receptor	CRHR1	2
Cu <sup>2+</sup> transporting ATPase beta polypeptide	ATP7B	1
Cyclic AMP response element binding protein	CREB	6
Cyclic AMP-dependent protein kinase	PKA	1
Cyclic nucleotide phosphodiesterase 1 B	PDE1B	1
Cyclic nucleotide phosphodiesterase 1 B 1	PDE1B1	1
Cyclic nucleotide phosphodiesterase 2A3	PDE2A3	1
Cyclic nucleotide phosphodiesterase 3A	PDE3A	1
Cyclic nucleotide phosphodiesterase 3B	PDE3B	1
Cyclic nucleotide phosphodiesterase 4A	PDE4A	1
Cyclic nucleotide phosphodiesterase 4C	PDE4C	1
Cyclic nucleotide phosphodiesterase 5A	PDE5A	1

Cyclic nucleotide phosphodiesterase 6A	PDE6A	1
Cyclic nucleotide phosphodiesterase 6B	PDE6B	1
Cyclic nucleotide phosphodiesterase 7	PDE7	1
Cyclic nucleotide phosphodiesterase 8	PDE8	1
Cyclic nucleotide phosphodiesterase 9A	PDE9A	1
Cyclooxygenase 1	COX1	1
Cyclooxygenase 2	COX2	1
CYP11A1	CYP11A1	1
CYP11B1	CYP11B1	1
CYP11B2	CYP11B2	1
CYP17	CYP17	1
CYP19	CYP19	1
CYP1A1	CYP1A1	1
CYP1A2	CYP1A2	1
CYP1B1	CYP1B1	1
CYP21	CYP21	1
CYP24	CYP24	1
CYP27	CYP27	1
CYP27B1	PDDR	1
CYP2A1	CYP2A1	1
CYP2A13	CYP2A13	1
CYP2A3	CYP2A3	1
CYP2A6V2	CYP2A6V2	1
CYP2A7	CYP2A7	1
CYP2B6	CYP2B6	1
CYP2C18	CYP2C18	1
CYP2C19	CYP2C19	1
CYP2C8	CYP2C8	1
CYP2C9	CYP2C9	1
CYP2D6	CYP2D6	1
CYP2E1	CYP2E1	1
CYP2F1	CYP2F1	1
CYP2J2	CYP2J2	1
CYP3A3	CYP3A3	1
CYP3A4	CYP3A4	1
CYP3A5	CYP3A5	1
CYP3A7	CYP3A7	1
CYP4A11	CYP4A11	1
CYP4B1	CYP4B1	1
CYP4F2	CYP4F2	1
CYP4F3	CYP4F3	1
CYP51	CYP51	1
CYP5A1	CYP5A1	1
CYP7A	CYP7A	1
CYP8	CYP8	1
Cystathionase	CTH	1
Cystathione beta synthase	CBS	1

Cytidine deaminase	CDA	1
Cytidine-5-prime-triphosphate synthetase	CTPS	1
Cytochrome a		1
Cytochrome c		1
Cytochrome c oxidase, MTCO		1
Delta aminolevulinate dehydratase	ALAD	1
Delta-7-dehydrocholesterol reductase	DHCR7	1
Dihydrolipoamide succinyltransferase		5
Dopamine beta hydroxylase	DBH	1
Dopamine receptors D1	DRD1	5
Dopamine receptors D2	DRD2	5
Dopamine receptors D3	DRD3	5
Dopamine receptors D4	DRD4	5
Dopamine receptors D5	DRD5	5
Endothelin 1	EDN1	5
Endothelin 2	EDN2	5
Endothelin 3	EDN3	5
Endothelin converting enzyme	ECE1	5
Endothelin receptor type A	EDNRA	5
Endothelin receptor type B	EDNRB	5
Enolase	ENO1	1
Epidermal growth factor	EGF	6
Epidermal growth factor receptor	EGFR	6
Excision repair complementation group 4 protein	ERCC4	1
Fibroblast growth factor	FGF1	6
Fibroblast growth factor receptor 1	FGFR1	6
Fibroblast growth factor receptor 2	FGFR2	6
Fibroblast growth factor receptor 3	FGFR3	6
Flightless-II, Drosophila homolog of	FLII	6
Fragile site, folic acid type, rare, fra(X) A	FRAXA	5
Fragile site, folic acid type, rare, fra(X) E	FRAXE	5
Fragile site, folic acid type, rare, fra(X) F	FRAXF	5
GABA receptor, alpha 1	GABRA1	5
GABA receptor, alpha 2	GABRA2	5
GABA receptor, alpha 3	GABRA3	5
GABA receptor, alpha 4	GABRA4	5
GABA receptor, alpha 5	GABRA5	5
GABA receptor, alpha 6	GABRA6	5
GABA receptor, beta 1	GABRB1	5
GABA receptor, beta 2	GABRB2	5
GABA receptor, beta 3	GABRB3	5
GABA receptor, gamma 1	GABRG1	5
GABA receptor, gamma 2	GABRG2	5
GABA receptor, gamma 3	GABRG3	5
GABA transaminase	ABAT	1
GDP dissociation inhibitor 1	GDI 1	6

Geniospasm 1	GSM1	6
Glial-cell derived neurotrophic factor (GDNF) receptor		5
Glial-cell derived neurotrophic factor, GDNF	GDNF	5
Glutamate decarboxylase, GAD	GAD1	1
Glutamate receptor 1	GLUR1	5
Glutamate receptor 2	GLUR2	5
Glutamate receptor 3	GLUR3	5
Glutamate receptor 4	GLUR4	5
Glutamate receptor 5	GLUR5	5
Glutamate receptor 6	GLUR6	5
Glutamate receptor 7	GLUR7	5
Glutamate receptor, ionotropic, NMDA 1	NMDAR1	5
Glutamate receptor, ionotropic, NMDA 2A	NMDAR2A	5
Glutamate receptor, ionotropic, NMDA 2B	NMDAR2B	5
Glutamate receptor, ionotropic, NMDA 2C	NMDAR2C	5
Glutamate receptor, ionotropic, NMDA 2D	NMDAR2D	5
Glutaryl-CoA dehydrogenase	GCDH	1
Glutathione	GSH	2
Glutathione S-transferase, GSTZ1	GSTZ1	1
Glyceraldehyde-3-phosphate dehydrogenase, GAPDH	GAPDH	1
Glycerol kinase	GK	1
Glycinamide ribonucleotide (GAR) transformylase	GART	1
Gonadotropin releasing hormone receptor	GNRHR	6
Guanidinoacetate N-methyltransferase	GAMT	1
Guanine nucleotide-binding protein, alpha activating activity polypeptide, GNAO	GNAO1	5
Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 1, GNAI1	GNAI1	5
Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 2, GNAI2	GNAI2	5
Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 3, GNAI3	GNAI3	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS1	GNAS1	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS2	GNAS2	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS3	GNAS3	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS4	GNAS4	5
Guanine nucleotide-binding protein, alpha transducing activity polypeptide, GNAT1	GNAT1	5
Guanine nucleotide-binding protein, alpha transducing activity polypeptide, GNAT2	GNAT2	5

Guanine nucleotide-binding protein, beta polypeptide 3	GNB3	5
Guanine nucleotide-binding protein, polypeptide	GNAQ	5
Guanylate cyclase 2D, membrane (retina-specific)	GUCY2D	1
Guanylate cyclase activator 1A (retina)	GUCA1A	1
Guanylyl cyclase		1
Heat shock protein, HSP60		4
Heat shock protein, HSP70		4
Heat shock protein, HSP90		4
Heat shock protein, HSPA1		4
Heat shock protein, HSPA2		4
Heparan sulfamidase		1
Hepatic lipase	LIPC	1
Histamine receptors, H1		5
Histamine receptors, H2		5
Histamine receptors, H3		5
HMG-CoA reductase	HMGCR	1
Huntingtin	HD	2
Hypoxanthine-guanine phosphoribosyltransferase, HGPRT	HPRT	1
Hypoxia inducible factor 1	HIF1A	1
Hypoxia inducible factor 2		1
Inositol monophosphatase	IMPA1	5
Insulin	INS	6
Insulin receptor	INSR	6
Interleukin(IL) 1 receptor	IL1R	4
Interleukin(IL) 1, alpha	IL1A	4
Interleukin(IL) 1, beta	IL1B	4
Interleukin(IL) 10	IL10	4
Interleukin(IL) 10 receptor	IL10R	4
Interleukin(IL) 11	IL11	4
Interleukin(IL) 11 receptor	IL11R	4
Interleukin(IL) 12	IL12	4
Interleukin(IL) 12 receptor, beta 1	IL12RB1	4
Interleukin(IL) 13	IL13	4
Interleukin(IL) 13 receptor	IL13R	4
Interleukin(IL) 2	IL2	4
Interleukin(IL) 2 receptor, alpha	IL2RA	4
Interleukin(IL) 2 receptor, gamma	IL2RG	4
Interleukin(IL) 3	IL3	4
Interleukin(IL) 3 receptor	IL3R	4
Interleukin(IL) 4	IL4	4
Interleukin(IL) 4 receptor	IL4R	4
Interleukin(IL) 5	IL5	4
Interleukin(IL) 5 receptor	IL5R	4

Interleukin(IL) 6	IL6	4
Interleukin(IL) 6 receptor	IL6R	4
Interleukin(IL) 7	IL7	4
Interleukin(IL) 7 receptor	IL7R	4
Interleukin(IL) 8	IL8	4
Interleukin(IL) 8 receptor	IL8R	4
Interleukin(IL) 9	IL9	4
Interleukin(IL) 9 receptor	IL9R	4
Interleukin(IL) receptor antagonist 1	IL1 RN, IL1RA	4
IP3 kinase		1
Leukin		4
Mismatch repair gene, PMSL2	PMS2	6
Monoamine oxidase A	MAOA	1
Monoamine oxidase B	MAOB	1
Muscarinic receptor, M1	CHRM1	5
Muscarinic receptor, M2	CHRM2	5
Muscarinic receptor, M3	CHRM3	5
Muscarinic receptor, M4	CHRM4	5
Muscarinic receptor. M5		
CHRM5		5
Myelin basic protein		3
Myosin, light chain 3	MYL3	3
reductase		
Nerve growth factor	NGF	6
Nerve growth factor receptor	NGFR	6
Neurite inhibitory protein		5
Neurofibromin 1	NF1	6
Neurofibromin 2	NF2	6
Neurofilament protein, NF68	NF68	3
Neurokinin A	NKNA	5
Neurokinin B	NKNB	5
Neuropeptide Y	NPY	5
Neuropeptide Y receptor Y1	NPY1R	5
Neuropeptide Y receptor Y2	NPY2R	5
Neurotensin	NTS	5
Neurotensin receptor	NTSR1	5
Nitric oxide synthase 1, NOS1	NOS1	1
Nitric oxide synthase 2, NOS2	NOS2	1
Nitric oxide synthase 3, NOS3	NOS3	1
Nucleoside diphosphate kinase-A	NDPKA	1
Oncogene sis	PDGFB	6
Opioid receptor, delta	OPRD1	5
Opioid receptor, kappa	OPRK1	5
Opioid receptor, mu	OPRMI	5
Ornithine delta-aminotransferase	OAT	1
Paraoxonase PON1	PON1	1
Parkin	PARK2	5

Phospholipase A2, group 10	PLA2G10	4
Phospholipase A2, group 1B	PLA2G1B	4
Phospholipase A2, group 2A	PLA2G2A	4
Phospholipase A2, group 2B	PLA2G2B	4
Phospholipase A2, group 4A	PLA2G4A	4
Phospholipase A2, group 4C	PLA2G4C	4
Phospholipase A2, group 5	PLA2G5	4
Phospholipase A2, group 6	PLA2G6	4
Phospholipase C alpha		4
Phospholipase C beta		4
Phospholipase C delta	PLCD1	4
Phospholipase C epsilon		4
Phospholipase C gamma	PLCG1	4
Platelet derived growth factor	PDGF	6
Platelet derived growth factor receptor	PDGFR	6
Potassium inwardly-rectifying channel J1	KCNJL	5
POU domain, class 1, transcription factor 1 (Pit1)	POU1F1	6
Presenilin 1	PSEN1	2
Presenilin 2	PSEN2	2
Prion protein	PRNP	5
Proline dehydrogenase	PRODH	1
Proopiomelanocortin	POMC	5
Prosaposin	PSAP	5
Protective protein for beta-galactosidase	PPGB	1
Protein kinase C, alpha	PRKCA	1
Protein kinase C, gamma	PRKCG	1
Protein kinase G		1
Protein phosphatase 1, regulatory (inhibitor) subunit 3	PPP1R3	1
Proteolipid protein	PLP	5
RIGUI	RIGUI	6
S100 calcium-binding protein A2	S100A2	5
S100 calcium-binding protein A3	S100A3	5
S100 calcium-binding protein A4	S100A4	5
S100 calcium-binding protein A5	S100A5	5
S100 calcium-binding protein A7	S100A7	5
S100 calcium-binding protein A8	S100A8	5
S100 calcium-binding protein A9	S100A9	5
S100 calcium-binding protein B	S100B	5
S100 calcium-binding protein P	S100P	5
Secretase, alpha		5
Secretase, beta		5
Secretase, gamma		5
Serotonin N-acetyltransferase	SNAT	1
Serotonin receptor, 5HT1A	HTR1A	5
Serotonin receptor, 5HT1B	HTR1B	5



Serotonin receptor, 5HT1C	HTR1C	5
Serotonin receptor, 5HT1D	HTR1D	5
Serotonin receptor, 5HT1E	HTR1E	5
Serotonin receptor, 5HT1F	HTR1F	5
Serotonin receptor, 5HT2A	HTR2A	5
Serotonin receptor, 5HT2B	HTR2B	5
Serotonin receptor, 5HT2C	HTR2C	5
Serotonin receptor, 5HT3	HTR3	5
Serotonin receptor, 5HT4	HTR4	5
Serotonin receptor, 5HT5	HTR5	5
Serotonin receptor, 5HT6	HTR6	5
Serotonin receptor, 5HT7	HTR7	5
Sodium channel, non-voltage gated 1, alpha	SCNN1A	5
Sodium channel, non-voltage gated 1, beta	SCNN1B	5
Sodium channel, non-voltage gated 1, gamma	SCNN1G	5
Sodium channel, voltage-gated, type 1, beta polypeptide	SCN1B	5
Solute carrier family 12, member 1	SLC12A1	2
Solute carrier family 12, member 2	SLC12A2	2
Solute carrier family 12, member 3	SLC12A3	2
Solute carrier family 4 (anion exchanger), member 1	SLC4A1	2
Solute carrier family 4 (anion exchanger), member 2	SLC4A2	2
Solute carrier family 4 (anion exchanger), member 3	SLC4A3	2
Solute carrier family 5 (sodium/glucose transporter), member 1	SLC5A1	2
Solute carrier family 5 (sodium/glucose transporter), member 2	SLC5A2	2
Solute carrier family 5 (sodium/glucose transporter), member 5	SLC5A5	2
Solute carrier family 5, member 3	SLC5A3	2
Solute carrier family 6 (GAMMA-AMINO BUTYRIC ACID transporter), member 1	SLC6A2	2
Solute carrier family 6 (neurotransmitter transporter, dopamine), member 3	SLC6A3	2
Solute carrier family 6 (neurotransmitter transporter, noradrenaline), member 2	SLC6A2	2
Solute carrier family 6 (neurotransmitter transporter, serotonin), member 4	SLC6A4	2
Superoxide dismutase 1	SOD1	1
Superoxide dismutase 3	SOD3	1
Synapsin 1a & 1b	SYN1	5
Synapsin 2a & 2b	SYN2	5
Synaptic vesicle amine transporter	SVAT	5
Synaptogyrin		5

Synaptophysin	SYP	5
Synaptosomal-associated protein, 25KD	SNAP25	5
Syntaxin 1	STX1	5
Tachykinin receptor, NK1R	TACR1	5
Tachykinin receptor, NK2R	TACR2	5
Tachykinin receptor, NK3R	TACR3	5
Talin	TLN	6
TEK, tyrosine kinase, endothelial	TEK	1
Telomerase protein component		1
Transcobalamin 1, TCN1		2
Transcobalamin 2, TCN2	TCN2	2
Transcription factor, TUPLE1	TUPLE1	5
Transforming growth factor, beta 2	TGFB2	6
Transforming growth factor, beta induced	TGFB1	6
Transforming growth factor, beta receptor 2	TGFB2	6
Transthyretin	TTR	2
Trypsin inhibitor		1
Tryptophan 2,3-dioxygenase	TDO2	5
Tryptophan hydroxylase	TPH	1
Tumour necrosis factor (TNF) receptor associated factor 1	TRAF1	4
Tumour necrosis factor (TNF) receptor associated factor 2	TRAF2	4
Tumour necrosis factor (TNF) receptor associated factor 3	TRAF3	4
Tumour necrosis factor (TNF) receptor associated factor 4	TRAF4	4
Tumour necrosis factor (TNF) receptor associated factor 5	TRAF5	4
Tumour necrosis factor (TNF) receptor associated factor 6	TRAF6	4
Tumour necrosis factor alpha	TNFA	4
Tumour necrosis factor alpha receptor	TNFAR	4
Tumour necrosis factor beta	TNFB	4
Tumour necrosis factor beta receptor	TNFBR	4
Tyrosinase	TYR	1
Tyrosine hydroxylase	TH	1
Ubiquitin		6
Ubiquitin activating enzyme, E1		1
Ubiquitin B	UBB	6
Ubiquitin C	UBC	6
Ubiquitin protein ligase E3A	UBE3A	1
UDP-glucuronosyltransferase 1	ugtld, UGTI	1
UDP-glucuronosyltransferase 2	UGT2	1
Uridinediphosphate(UDP)-galactose-4-epimerase	GALE	1
Vacuolar proton pump, subunit 1	VPP1	5

Vacuolar proton pump, subunit 3	VPP3	5
Vesicular monoamine transporter 1	VMAT1	5
Vesicular monoamine transporter 2	VMAT2	5,

## Legende für die Spalte Proteinfunktion:

1	Enzym	2	Transport und Lagerung
3	Struktur	4	Immunität
5	Nervale Transmission	6	Wachstum und Differenzierung

**Tabelle 8****kardiovaskuläre Krankheit, Fehlfunktion oder Schädigung**

<b>Liste der Gene</b>	<b>HUGO Gensymbol</b>	<b>Protein- funktion</b>
17beta hydroxysteroid oxidoreductase	1	
2,3-bisphosphoglycerate mutase	BPGM	1
3 beta hydroxysteroid dehydrogenase 2	HSD3B2	1
3-oxoacid CoA transferase	OXCT	1
5,10-methylenetetrahydrofolate reductase (NADPH)	MTHFR	1
Acetoacetyl 1-CoA-thiolase	ACAT1	1
Acetoacetyl 2-CoA-thiolase	ACAT2	1
Acetyl CoA acyltransferase	ACAA	1
Acetylcholinesterase	ACHE	1
Acid phosphatase 2, lysosomal	ACP2	1
Acidic amino acid transporter	2	
Actin, alpha, cardiac	ACTC	3
Actin, alpha, skeletal	ACTAL	3
Actin, alpha, smooth, aortic	ACTA2	3
Activin A receptor, type 2B	ACVR2B	6
Acyl CoA dehydrogenase, long chain	ACADL	1
Acyl CoA dehydrogenase, very long chain	ACADVL	1
Adaptin, beta 3A	ADTB3A	2
Adducin, alpha	ADDI	3
Adducin, beta	ADD2	3
Adenosine deaminase	ADA	1
Adenosine receptor A1	ADORAL	5
Adenosine receptor A2A	ADORA2A	5
Adenosine receptor A2B	ADORA2B	5
Adenosine receptor A3	ADORA3	5
Adenylate cyclase 1	ADCY1	1
Adenylate cyclase 2.	ADGY2	1
Adenylate cyclase 3	ADCY3	1
Adenylate cyclase 4	ADCY4	1
Adenylate cyclase 5	ADCY5	1
Adenylate cyclase 6	ADCY6	1
Adenylate cyclase 7	ADCY7	1
Adenylate cyclase 8	ADCY8	1
Adenylate cyclase 9	ADCY9	1
Adenylate kinase	AK1	1
Adrenergic receptor, alpha1	ADRA1	5
Adrenergic receptor, alpha2	ADRA2	5
Adrenergic receptor, beta1	ADRB1	5
Adrenergic receptor, beta2	ADRB2	5
Adrenergic receptor, beta3	ADRB3	5

Adrenocorticotrophic hormone (ACTH) receptor	ACTHR	6
Alanine aminotransferase		2
Alanine-glyoxylate aminotransferase	AGXT	1
Albumin, ALB	ALB	2
Alcohol dehydrogenase 1	ADHL	1
Alcohol dehydrogenase 2	ADH2	1
Alcohol dehydrogenase 3	ADH3	F=
Alcohol dehydrogenase 5	ADH5	1
Alcohol dehydrogenase 6	ADH6	1
Alcohol dehydrogenase 7	ADH7	1
Aidehyde dehydrogenase 1	ALDHL	1
Aidehyde dehydrogenase 10	ALDH10	1
Aidehyde dehydrogenase 2	ALDH2	1
Aldehyde dehydrogenase 5	ALDH5	1
Aldehyde dehydrogenase 6	ALDH6	1
Aldehyde dehydrogenase 7	ALDH7	1
Aldolase A	ALDOA	1
Aidolase B	ALDOB	1
Aldolase C	ALDOC	1
Aldosterone receptor	MLR	6
Alpha 1 acid glycoprotein	G; AGP	2
Alpha 2 macroglobulin	A2M	4
alphal-antitrypsin	Pi	1
alpha2-antiplasmin	PLI	1
a pha-actinin 2	ACTN2	6
alpha-actinin 3	ACTN3	6
alpha-Galactosidase A	GLA	1
alpha-L-Iduronidase	IDUA	1
Aminopeptidase P	XPNPEP2	1
Amphiregulin	AREG	6
Amylo-1,6-glucosidase	AGL	1
Angiopoietin 1	ANGPT1	6
Angiopoietin 2	ANGPT2	6
Angiotensin converting enzyme	ACE,DCPL	1
Angiotensin receptor 1	AGTRI	2
Angiotensi 'n receptor 2	AGTR2	2
Angiotensinogen	AGT	1
Ankyrin 1	ANKI	3
Ankyrin 2	ANK2	3
Ankyrin 3	ANK3	3
Annexin I	ANXI	4
Antidiuretic hormone receptor	ADHR	2
Antithrombin III	AT3	1
Apolipoprotein (a)	LPA	2
Apolipoprotein A 4	APOA4	2
Apolipoprotein A I	APOAI	2
Apolipoprotein A 11	APOA2	2

Apolipoprotein B	APOB	2
Apolipoprotein C1	APOC1	2
Apolipoprotein C2	APOC2	2
Apolipoprotein C3	APOC3	2
Apolipoprotein D	APOD	2
Apolipoprotein E	APOE	2
Apolipoprotein H	APOH	2
Aquaporin I	AQPL	2
Aquaporin 2	AQP2	2
Arginine vasopressin	AVP	5
Arginine vasopressin receptor 1A	AVPRLA	5
Arginine vasopressin receptor 1B	AVPRLB	5
Arginine vasopressin receptor 2	AVPR2	5
Arginosuccinate lyase	ASL	1
Arylsulfatase B	ARSB	1
Aspartylglucosaminidase	AGA	1
Ataxia telangiectasia gene, AT	ATM	6
ATP/ADP translocase	1	
ATP-binding cassette transporter 7	ABC7	4
Atrial natriuretic peptide	ANP	6
Atrial natriuretic peptide receptor A	NPRL	6
Atrial natriuretic peptide receptor B	NPR2	6
Atrial natriuretic peptide@ receptor C	NPR3	6
Autoimmune regulator, AIRE	AIRE	4
BCL2-related protein A1	BCL2AI	6
beta 2 microglobulin	B2M	
beta-endorphin receptor N		
Bile acid coenzyme A: amino acid N-acyltransferase	BAAT	1
Bile salt export pump	BSEP, PFIC2	2
Bile salt-stimulated lipase	CEL	1
Bilirubin UDP-glucuronosyltransferase	1	
Bloom syndrome protein	BLM	6
Bradykinin receptor B1		
Bradykinin receptor B2		
Butyrylcholinesterase	BCHE	1
Ca(2+) transporting ATPase, fast twitch	ATP2AI	2
Ca(2+) transporting ATPase, slow twitch	ATP2A2	2
Cadherin E	CDHL	6
Cadherin EP	6	
Cadherin N	CDH2	6
Cadherin P	CDH3	6
Calbindin I	CALB1	6
Calbindin D9K	CALB3	6
Calcineurin A1	CALNAL	4
Calcineurin A2	CALNA2	
Calcineurin A3	CALNA3	

Calcineurin B		
Calcium channel, voltage-dependent, alpha 1 F subunit	CACNAL F	5
Calcium channel, voltage-dependent, Alpha-1B (CACNL1A5)	CACNA1B	5
Calcium channel, voltage-dependent, Alpha-1 c	CACNAL C	5
Calcium channel, voltage-dependent, Alpha-1 D	CACNAL D	5
Calcium channel, voltage-dependent, Alpha-1E (CACNL1A6)	CACNAL E	5
Calcium channel, voltage-dependent, Alpha-2/delta	CACNA2	5
Calcium channel, voltage-dependent, Beta 1	CACNBI	5
Calcium channel, voltage-dependent, Beta 3	CACNB3	5
Calcium channel, voltage-dependent, L type, alpha 1S subunit	CACNAL S	5
Calcium channel, voltage-dependent, Neuronal, Gamma	CACNG2	5
Calcium channel, voltage-dependent, P/Q type, alpha 1A subunit	CACNALA	5
Calcium channel, voltage-dependent, T-type		5
Calmodulin I	CALMI	6
Calmodulin 2	CALM2	6
Calmodulin 3	CALM3	6
Calmodulin-dependant protein kinase 11	CAMK2A	6
Calpain	CAPNCAPN3	1
Calretinin	CALB2	5
Carbonic anhydrase 3	CA3	1
Carbonic anhydrase 4	CA4	1
Carbonic anhydrase, alpha	CA1	1
Carbonic anhydrase, beta	CA2	1
Carboxypeptidase	CPN	1
Cardiac-specific homeobox, CSX	csx	6
Carnitine acylcarnitine translocase	CACT	1
Carnitine transporter protein	CDSP,SCD	2
Cartilage-hair hypoplasia gene	CHH	5
Catechol-O-methyltransferase	COMT	1
Caveolin 3	CAV3	1
CD1	CDI	
CD4	CD4	
Cdc 25 phosphatase		6
Cell adhesion molecule, intercellular, ICAM	ICAMI	6
Cell adhesion molecule, leukocyte-endothelial, LECAM (CD62)	LECAM1	6
Cell adhesion molecule, liver, LCAM	LCAM	6
Cell adhesion molecule, neural, NCAM1	NCAM1	6
Cell adhesion molecule, neural, NCAM2	NCAM2	6
Cell adhesion molecule, platelet-endothelial,	PECAM1	6

PECAM		
Cell adhesion molecule, vascular, VCAM	VCAM1	6
Cellubrevin	CEB	5
Ceroid lipofuscinosis neuronal 3	CLN3	5
Ceruloplasmin precursor	CP	1
Chemokine receptor CCR2	CCR2	
Chemokine receptor CCR3	CCR3	
Chemokine receptor CCR5	CCR5	
Chemokine receptor CXCR1	CXCR1	
Chemokine receptor CXCR2	CXCR2	
Chemokine receptor CXCR4	CXCR4	
Chloride channel KB	CLCNKB	3
Cholestasis, progressive familial intrahepatic 1 gene	FICI	6
Cholesterol ester transfer protein	CETP	2
Choline acetyltransferase	CHAT	1
Chymase	CHYI	
Clathrin	2	
Cockayne syndrome gene, CKNI	CKNI	6
Collagen I alpha 1	COL1A1	3
Collagen I alpha 2	COL1A2	3
Collagen 11 alpha 1	COL2A1	3
Collagen III alpha 1	COL3A1	3
Collagen IV alpha 1	COL4A1	3
Collagen IV alpha 2	COL4A2	3
Collagen IV alpha 3	COL4A3	3
Collagen IV alpha 4	COL4A4	3
Collagen IV alpha 5	COL4A5	3
Collagen IV alpha 6	COL4A6	3
Collagen IX alpha 2	COL9A2, EDM2	3
Collagen IX alpha 3	COL9A3	3
Collagen receptor	COLR	3
Collagen V alpha 1	COL5A1	3
Collagen V alpha 2	COL5A2	3
Collagen VI alpha 1	COL6A1	3
Collagen VI alpha 2	COL6A2	3
Collagen VI alpha 3	COL6A3	3
Collagen VII alpha 1	COL7A1	3
Collagen X alpha 1	COL10A1	3
Collagen X alpha 1	COL11A1	3
Collagen Xi alpha 2	COL11A2	3
Collagen XVII alpha 1	COL17A1	3
Collagenic-like tail subunit of asymmetric acetylcholinesterase	COLQ	1
Colony-stimulating factor 2 beta receptor	CSF2RB	6
Colony-stimulating factor 3	CSF3	6
Colony-stimulating factor 3 receptor	CSF3R	6



Corticosteroid binding globulin	CBG	5
Cortico-sterold binding protein	2	
Corticotrophin-releasing hormone	CRH	2
Corticotrophin-releasing hormone receptor	CRHR1	2
Creb binding protein	CREBBP	6
Cu2+ transporting ATPase alpha polypeptide	ATP7A	1
Cu2+ transporting ATPase beta polypeptide	ATP7B	1
Cubilin	CUBN	2
Cyclic AMP-dependent protein kinase	PKA	1
Cyclin-dependent kinase 2	CDK2	6
Cyclin-dependent kinase inhibitor 1C (P57, KIP2)	CDKNIC	6
Cyclooxygenase I	coxi	1
Cyclooxygenase 2	COX2	1
CYPL 1A1	CYP11A1	1
CYPL 1 B1	CYP11B1	1
CYP1 1 B2	CYP11B2	1
CYP17	CYP17	1
CYP19	cypig	1
CYP1A1	CYP1A1	1
CYP1A2	CYP1A2	1
CYP1B1	CYP1B1	1
CYP21	CYP21	1
CYP24	CYP24	1
CYP27	CYP27	1
CYP27B1	PDDR	1
CYP2A1	CYP2A1	1
CYP2A13	CYP2A1 3	1
CYP2A3	CYP2A3	1
CYP2A6V2	CYP2A6V2	1
CYP2A7	CYP2A7	1
CYP2B6	CYP2B6	1
CYP2C18	CYP2C18	F-
CYP2C19	CYP2C19	1
CYP2C8	CYP2C8	1
CYP2C9	CYP2C9	1
CYP2E1	CYP2E1	1
CYP2F1	CYP2F1	1
CYP2J2	CYP2J2	1
CYP3A3	CYP3A3	1
CYP3A4	CYP3A4	1
CYP3A5	CYP3A5	1
CYP3A7	CYP3A7	1
CYP4A11	CYP4A11	1
CYP4B1	CYP4B1	1
CYP4F2	CYP4F2	1
CYP4F3	CYP4F3	1
CYP51	CYP51	1

CYP5A1	CYP5A1	1
CYP7A	CYP7A	1
CYP8	CYP8	1
Cystathionase	CTH	1
Cystathione beta synthase	CBS	1
Cytidine deaminase	CDA	1
Cytidine-5-prime-triphosphate synthetase	CTPS	1
Cytochrome a	1	
Cytochrome b-5	CYB5	1
Cytochrome c	1	
Cytochrome c oxidase, MTCO	1	
DAX1 nuclear receptor	DAX1	4
Delta aminolevulinate dehydratase	ALAD	1
Delta(4)-3-oxosteroid 5-beta-reductase	1	
Delta-7-dehydrocholesterol reductase	DHCR7	1
Deoxycorticosterone (DOC) receptor	1	
Desmin	DES	3
Dihydrodiol dehydrogenase 1	DDHL	1
Dihydrofolate reductase	DHFR	1
Dihydrolipoyl dehydrogenase	1	
Dihydrolipoyl dehydrogenase 2	PDHA	1
Dihydrolipoyl transacetylase	PDHA	1
DM-Kinase	DMPK	1
DOPA decarboxylase	DDC	1
Dopamine beta hydroxylase	DBH	1
Dopamine receptors D1	DRD1	5
Dopamine receptors D2	DRD2	5
Dopamine receptors D3	DRD3	5
Dopamine receptors D4	DRD4	5
Dopamine receptors D5	DRD5	5
Duffy blood group	FY	2
Dynamin	DNMI	6
Dystrophia myotonica	DM, DMPK	1
Dystrophia myotonica, atypical	DM2	1
Dystrophin	DMD	3
Elastin	ELN	3
Emerin	EMD	2
Endocardial fibroelastosis 2 gene	EFE2	3
Endoglin	ENG	3
Endometrial bleeding-associated factor	EBAF	6
Endothelin 1	EDN1	5
Endothelin 2	EDN2	5
Endothelin 3	EDN3	5
Endothelin converting enzyme	ECE1	5
Endothelin receptor type A	EDNRA	5
Endothelin receptor type B	EDNRB	5
Enolase	EN01	1

Enoyl CoA isomerase		1
Ephrin receptor tyrosine kinase A	EPHA	6
Ephrin receptor tyrosine kinase B	EPHB	6
Epidermal growth factor	EGF	6
Epidermal growth factor receptor	EGFR	6
Erythrocyte membrane protein band 4.1	EPB41	3
Erythrocyte membrane protein band 4.2	EPB42	3
Erythrocyte membrane protein band 7.2	EPB72	3
Erythroid kruppel-like factor	EKLF	6
Erythropoietin	EPO	
Erythropoietin receptor	EPOR	
Estrogen receptor	ESR	6
Facio-genital dysplasia	FGD1, FGDY	2
Factor 1 (No. one)	FI	
Factor B, properdin		
Factor D		
Factor H	HFI	
Factor I (letter 1)	IF	
Factor III	F3	
Factor IX	F9	
Factor V	F5	
Factor VI I	F7	4
Factor VI II	F8	4
Factor X	F10	4
Factor Xi	Fi1	4
Factor XI I	F12	4
Factor XIII A & B	F13A & F13B	4
Fanconi anemia, complementation group A	FANCA	2
Fanconi anemia, complementation group C	FANCC	2
Fanconi anemia, complementation group D	FANCD	2
Fatty acid binding proteins FABPI		2
Fatty acid binding proteins FABP2	FABP2	2
Fatty acid binding proteins FABP3		2
Fatty acid binding proteins FABP4		2
Fatty acid binding proteins FABP5		2
Fatty acid binding proteins FABP6		2
Fc fragment of IgG, high affinity IA, receptor for	FCGRIA	6
Fc fragment of IgG, low affinity IIa, receptor for (CD32)	FCGR2A	6
Fc fragment of IgG, low affinity IIIa, receptor for (CD 1 6)	FCGR3A	6
Fibrillin 1	FBNI	6
Fibrillin 2	FBN2	6
Fibrinogen alpha	FGA	3
Fibrinogen beta	FGB	3
Fibrinogen gamma	FGG	3
Fibroblast growth factor	FGFI	6

Fibroblast growth factor receptor 1	FGFRI	6
Fibroblast growth factor receptor 2	FGFR2	6
Fibroblast growth factor receptor 3	FGFR3	6
Fibronectin precursor	FNI	6
Flightless-11, Drosophila homolog of	FLII	6
Follicle stimulating hormone receptor	FSHR,ODG1	6
Follicle stimulating hormone, FSH	FSHB	6
Formiminotransferase		1
Fragile site, folic acid type, rare, fra(X) A	FRAXA	5
Fucosidase alpha-L-2		1
Fucosyltransferase 2	FUT2	2
Fucosyltransferase 3	FUT3	2
Fucosyltransferase 6	FUT6	2
Fukuyama type congenital muscular dystrophy	FCMD	6
GABA receptor, alpha 1	GABRAL	5
GABA receptor, alpha 2	GABRA2	5
GABA receptor, alpha 3	GABRA3	5
GABA receptor, alpha 4	GABRA4	5
GABA receptor, alpha 5	GABRA5	5
GABA receptor, alpha 6	GABRA6	5
GABA receptor, beta 1	GABRB1	5
GABA receptor, beta 2	GABRB2	5
GABA receptor, beta 3	GABRB3	5
GABA receptor, gamma 1	GABRG1	5
GABA receptor, gamma 2	GABRG2	5
GABA receptor, gamma 3	GABRG3	5
GABA transaminase	ABAT	1
Galactose 1-phosphate uridyl-transferase	GALT	1
Galactosyltransferase I	GTI	6
Galactosyltransferase, alpha 1,3	GGTAL	6
Galactosyltransferase, beta 3	B3GALT	6
Ga anin	GAL	5
Galanin receptor	GALNRI	5
Gamma-glutamyl carboxylase	GGCX	2
Gap junction protein alpha I	GJAL	2
Gap junction protein beta I	GJBL	2
Gap junction protein beta 2	GJB2	2
Glucocorticoid receptor	GRL	6
Glucosaminyl (N-acetyl) transferase 2, I-branching enzyme	GCNT2	1
Glucosidase, acid alpha	GAA	1
Glucosidase, acid beta	GBA	1
Glutamate decarboxylase, GAD	GAD1	1
Glutamate receptor 1	GLURI	5
Glutamate receptor 2	GLUR2	5
Glutamate receptor 3	GLUR3	5
Glutamate receptor 4	GLUR4	5

Glutamate receptor 5	GLUR5	5
Glutamate receptor 6	GLUR6	5
Glutamate receptor 7	GLUR7	5
Glutamate receptor, ionotropic, NMDA 1	NMDAR1	5
Glutamate receptor, ionotropic, NMDA 2A	NMDAR2A	5
Glutamate receptor, ionotropic, NMDA 2B	NMDAR2B	5
Glutamate receptor, ionotropic, NMDA 2C	NMDAR2C	5
Glutamate receptor, ionotropic, NMDA 2D	NMDAR2D	5
Glutamate-cysteine ligase	GLCLC	1
Glutaryl-CoA dehydrogenase	GCDH	1
Glutathione	GSH	2
Glutathione peroxidase, GPXI	GPXL	1
Glutathione reductase, GSR	GSR	1
Glutathione S-transferase, GSTZI	GSTZI	1
Glyceraldehyde-3-phosphate dehydrogenase, GAPDH	GAPDH	1
Glycerol kinase	GK	1
Glycinamide ribonucleotide (GAR) transformylase	GART	1
Glycophorin A	GYPA	3
Glycophorin B	GYPB	3
Glycophorin C	GYPC	3
Glycosyltransferases, ABO blood group	ABO	1
Growth arrest-specific homeobox	GAX	6
Guanine nucleotide-binding protein, alpha activating activity polypeptide, GNAO	GNAOI	5
Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 1, GNAII	GNAII	5
Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 2, GNA12	GNA 2	5
Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 3, GNA13	GNA13	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS1	GNAS1	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS2	GNAS2	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS3	GNAS3	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS4	GNAS4	5
Guanine nucleotide-binding protein, beta polypeptide 3	GNB3	5
Guanine nucleotide-binding protein, gamma polypeptide 5	GNG5	5
Guanine nucleotide-binding protein, q polypeptide	GNAQ	5
Guanylyl cyclase		1
H(+), K(+) - ATPase	ATP4B	5

Haemoglobin alpha I	HBAL	2
Haemoglobin alpha 2	HBA2	2
Haemoglobin beta	HBB	2
Haemoglobin delta	HBD	2
Haemoglobin epsilon		2
Haemoglobin gamma A	HBGL	2
Haemoglobin gamma 8	HBG2	2
Haemoglobin gamma G	HBGG	2
Haptoglobin, alpha 1	HPAI	
Haptoglobin, alpha 2	HPA2	
Haptoglobin, beta	HPB	
Heat shock protein, HSP60		
Heat shock protein, HSP70		
Heat shock protein, HSP90		
Heat shock protein, HSPAI		
Heat shock protein, HSPA2		
Hemochromatosis	HFE	2
Hemopexin	HPX	4
Heparan sulfamidase		1
Heparin binding epidermal growth factor	HBEGF	6
Heparin Cofactor 11	HCF2	4
Hepatic lipase	LPC	1
Hermansky-pudlak syndrome gene	HPS	2
Hexokinase 1	HKI	1
Hexosaminidase A	HEXA,TSD	1
Hexosaminidase B	HEXB	1
Histidine-rich glycoprotein	HRG	2
HLA-B associated transcript 1	BATI	4
HLH transcription factor HAND1	HAND1	6
HLH transcription factor HAND2	HAND2	6
HMG-COA lyase	HMGCL	1
HMG-COA reductase	HMGCR	1
HMG-COA synthase	HMGCS2	1
Homeobox (HOX) gene A1 3	HOXA13	6
Homeobox HB24	HLXL	6
Hormone-sensitive lipase	HSL	1
Human chorionic gonadotrophin, hCG	CG	6
Human placental lactogen	CSHI	6
Hypoxanthine-guanine phosphoribosyltransferase, HGPRT	HPRT	1
Hypoxia inducible factor 1	HiF1A	1
Hypoxia inducible factor 2		1
IC7 A and B		4
Iduronate 2 sulphatase	IDS	1
Indian hedgehog, ihh	IHH	6
Inosine triphosphatase	ITPA	1
Inositol 1,4,5-triphosphate receptor 1	ITPRL	6

Inositol 1,4,5-triphosphate receptor 3	ITPR3	6
Inositol monophosphatase	IMPAL	5
Inositol polyphosphate 1-phosphatase	INPPI	5
Insulin	INS	6
Insulin receptor	INSR	6
Insulin receptor substrates	IRS1	6
Insulin-like growth factor 1	IGF1	6
Insulin-like growth factor 1 receptor	IGF1 R	6
Insulin-like growth factor 2	IGF2	6
Insulin-like growth factor 2 receptor	IGF2R	6
Integrin beta 1	ITGBL	6
Integrin beta 2	ITGB2	6
Integrin beta 3	ITGB3	6
Integrin beta 4	ITGB4	6
Integrin beta 5	ITGB5	6
Integrin beta 6	ITGB6	6
Integrin beta 7	ITGB7	6
Integrin, alpha 1	ITGAL	6
Integrin, alpha 2	ITGA2	6
Integrin, alpha 3	ITGA3	6
Integrin, alpha 4	ITGA4	6
Integrin, alpha 5	ITGA5	6
Integrin, alpha 6	ITGA6	6
Integrin, alpha 7	ITGA7	6
Integrin, alpha 8	ITGA8	6
Integrin, alpha 9	ITGA9	6
Integrin, alpha M	ITGAM	6
Integrin, alpha X	ITGAX	6
Inter-alpha-trypsin inhibitor, IATI		1
Intercellular adhesion molecule 1	ICAMI	
Intercellular adhesion molecule 2	ICAM2	
Intercellular adhesion molecule 3	ICAM3	
Interferon alpha	IFNAI	
Interferon beta	IFNB	
Interferon gamma	IFNG	
Interferon gamma receptor 1	IFNGRL	
Interferon gamma receptor 2	IFNGR2	
Interleukin(IL) 1 receptor	IL1 R	
Interleukin(IL) 1, alpha	IL1A	
Interleukin(IL) 1, beta	IL1B	
Interleukin(IL) 10	IL10	
Interleukin(IL) 10 receptor	IL10R	
Interleukin(IL) 11	IL11	
Interleukin(IL) 11 receptor	IL11R	
Interleukin(IL) 12	IL12	
Interleukin(IL) 12 receptor, beta 1	IL12RB1	4
Interleukin(IL) 13	IL13	4

Interfeukin(IL) 13 receptor	IL13R	4
Intedeukin(IL) 2	IL2	4
Interleukin(IL) 2 receptor, alpha	IL2RA	4
Interleukin(IL) 2 receptor, gamma	IL2RG	4
Interleukin(IL) 3	IL3	
Interleukin(IL) 3 receptor	IL3R	
Interieukin(IL) 4	IL4	
Interieukin(IL) 4 receptor	IL4R	
Interieukin(IL) 5	IL5	
Interleukin(IL) 5 receptor	IL5R	
Intedeukin(IL) 6	IL6	
Interieukin(IL) 6 receptor	IL6R	
Interleukin(IL) 7	IL7	
Interleukin(IL) 7 receptor	IL7R	
Interieukin(IL) 8	IL8	
Intedeukin(IL) 8 receptor	IL8R	4
Interfeukin(IL) 9	IL9	4
Interleukin(IL) 9 receptor	IL9R	
Interieukin(IL) receptor antagonist 1	IL1RN, ILLRA	
IP3 kinase		1
Isovaleric acid CoA dehydrogenase	IVD	1
Kallikrein 3	KAK3	4
Kell blood group precursor	XK, KEL	2
Ketohexokinase	KHK	1
Kininogen, High molecular weight	KNG	4
Kynureninease		1
Lactate dehydrogenase, A	LDHA	1
Lactate dehydrogenase, B	LDHB	1
Lamin A/C	LMNA	6
Laminin 5, alpha 3	LAMA3	6
Laminin 5, beta 3	LAMB3	6
Laminin 5, gamma 2	LAMC2	6
Laminin M	LAMM	6
Laminin receptor 1	LAMRI	6
Latent transforming growth factor-beta binding protein 2	LTBP2	6
Lecithin-cholesterol acyltransferase	LCAT	
Lectin, mannose-binding 1	LMANI	
Lectin, mannose-binding 2	MBL2	
Leptin	LEP	6
Leptin receptor	LEPR	6
Leukocyte-specific transcript 1	LST-1	4
Leukotriene A4 synthase	LTA4S	1
Leukotriene B4 receptor		4
Leukotriene B4 synthase	LTB4S	1
Leukotriene C4 synthase	LTC4S	1
LIM homeobox protein I	LHXL	6



Lipocortin I	ANX4	4
Lipoprotein lipase	LPL	4
Lipoprotein receptor, Low Density	LDLR	2
Lipoprotein, High Density	HDLDTI	2
Lipoprotein, Very Low Density	VLDLR	2
Lipoprotein-associated coagulation factor	LACI	4
Lipoxygenase		1
Lipoxygenase 12 (platelets)	LOG12	4
Long QT-type 2 potassium channels	LQT2, KCNH2	2
Low density lipoprotein receptor-related protein precursor	LRP	2
Lymphoid enhancer-binding factor	LEF-1	6
Lysosomal acid lipase	LIPA	1
Macrophage inflammatory protein-2	MIP2	4
MAD (mothers against decapentaplegic, Drosophila) homologue 4	MADH4	6
MADS box transcription-enhancer factor 2A	MEF2A	6
MADS box transcription-enhancer factor 2B	MEF2B	6
Mannosidase, alpha B lysosomal	MANB	1
Matrix Gla protein	MGP	6
Matrix metalloproteinase I	mmp1	1
Matrix metalloproteinase IO	mmp10	1
Matrix metalloproteinase 11	mmp11	1
Matrix metalloproteinase 12	MMP12	1
Matrix metalloproteinase 13	MMP13	1
Matrix metalloproteinase 14	MMP14	1
Matrix metalloproteinase 15	MMP15	1
Matrix metalloproteinase 16	MMP16	1
Matrix metalloproteinase 17	MMP17	1
Matrix metalloproteinase 18	MMP18	1
Matrix metalloproteinase 19	m P19	1
Matrix metalloproteinase 2	MMP2	1
Matrix metalloproteinase 3	MMP3, STMY1	1
Matrix metalloproteinase 4	MMP4	1
Matrix metalloproteinase 5	MMP5	1
Matrix metalloproteinase 6	MMP6	1
Matrix metalloproteinase 7	MMP7	1
Matrix metalloproteinase 8	MMP8	1
Matrix metalloproteinase 9	MMP9	1
Melanocortin 2 receptor	MC2R	2
Melanocortin 4 receptor	MC4R	2
Methionine synthase	MTR	1
Methionine synthase reductase	MTRR	1
Methylmalonyl-CoA mutase	MUT	1
Mevalonate kinase	MVK	
MHC Class 1: A		
MHC Class 1: B		

MHC Class I: C		
MHC Class I: LMP-2, LMP-7		
MHC Class I: Tap1	ABCR, TAP1	
MHC Class II: DP	HLA-DPBI	
MHC Class II: DQ		
MHC Class II: DR		
MHC Class II: Tap2	TAP2, PSF2	
MHC Class II: Complementation group A	MHC2TA	
MHC Class II: Complementation group B	rfxank	
MHC Class II: Complementation group C	RFX5	
MHC Class II: Complementation group D	RFXAP	
Microsomal triglyceride transfer protein	MTP	2
Mismatch repair gene, PMSL2	PMS2	6
Mitochondrial trifunctional protein, alpha subunit	HADHA	1
Mitochondrial trifunctional protein, beta subunit	HADHB	1
Molybdenum cofactor synthesis 1	mocsi	1
Molybdenum cofactor synthesis 2	MOCS2	1
Monoamine oxidase A	MAOA	1
Monoamine oxidase B	MAOB	1
Monocyte chemoattractant protein 1	mcpl	4
Mucopolidoses	GNPTA	1
Mulibrey nanism	MUL	2
Muscarinic receptor, M1	CHRM1	5
Muscarinic receptor, M2	CHRM2	5
Muscarinic receptor, M3	CHRM3	5
Muscarinic receptor, M4	CHRM4	5
Muscarinic receptor, M5	CHRM5	5
MutS homolog 3	MSH3	6
Myoglobin		2
Myosin, cardiac	MYH7	3
Myosin, light chain 2	MYL2	3
Myosin, light chain 3	MYL3	3
Myosin-binding protein C, cardiac	MYBPC3	3
Myotubularin	MTM1	3
Na <sup>+</sup> , K <sup>+</sup> ATPase, alpha	ATPIAL	6
Na <sup>+</sup> , K <sup>+</sup> ATPase, beta 1	ATPIBL	6
Na <sup>+</sup> , K <sup>+</sup> ATPase, beta 2	ATPIB2	6
Na <sup>+</sup> , K <sup>+</sup> ATPase, beta 3	ATPIB3	6
Na <sup>+</sup> /H <sup>+</sup> exchanger 1	NHE1	2
Na <sup>+</sup> /H <sup>+</sup> exchanger 2	NHE2	2
Na <sup>+</sup> /H <sup>+</sup> exchanger 3	NHE3	2
Na <sup>+</sup> /H <sup>+</sup> exchanger 4	NHE4	2
Na <sup>+</sup> /H <sup>+</sup> exchanger 5	NHE5	2
N-acetylglucosamine-6-sulfatase	GNS	1
NADPH oxidase reductase		4
NB6		

Nebulin	NEB	3
Nephronophthisis 1	NPHP1	2
Neuraminidase sialidase	NEU	2
Neuregulin	HGL	6
Neurite inhibitory protein	5	
Neuroendocrine convertase 1	NEC1, PCSK1	1
Neurokinin A	NKNA	5
Neurokinin B	NKNB	5
Neuropeptide Y	NPY	5
Neuropeptide Y receptor Yi	NPYIR	5
Neuropeptide Y receptor Y2	NPY2R	5
Neutrophil cystolic factor 1	NCF1	
Neutrophil cystolic factor 2	NCF2	
Niemann-Pick disease protein	NPCL	2
Nitric oxide synthase 1, NOS1	NOS1	1
Nitric oxide synthase 2, NOS2	NOS2	1
Nitric oxide synthase 3, NOS3	NOS3	1
Notch ligand -jagged 1	JAG 1, AG S	6
Nuclear factor 1-kappa-B-like gene	IKBL	4
Oncogene sis	PDGFB	6
Oncostatin M	osm	6
Oncostatin M receptor	OSMR	6
Osteonectin	ON	6
Osteopontin	OPN	6
Osteoprotegedn	OPG	6
Pancreatic lipase	PNLIP	1
Pancreatic lipase related protein 1	PLRPI	1
Pancreatic lipase related protein 2	PLRP2	1
Paraoxonase PON1	PON1	1
Paraoxonase PON2	PON2	1
Paraoxonase PON3		1
Parvalbumin	PVALB	6
Patched (Drosophila) homolog, PTCH	PTCH	6
PCNA (proliferating cell nuclear antigen)		1
Pepsinogen		1
Peroxidase, salivary	SAPX	1
Peroxisomal membrane protein 1	PXMPI	3
Peroxisomal membrane protein 3	PXMP3	2
Peroxisome biogenesis factor I	PEXI	2
Peroxisome biogenesis factor 1 9	PEX19	2
Peroxisome biogenesis factor 6	PEX6	2
Peroxisome biogenesis factor 7	PEX7	2
Peroxisome proliferative activated receptor, alpha	PPARA	2
Peroxisome proliferative activated receptor, gamma	PPARG	2
Peroxisome receptor 1	PXRI	2

P-glycoprotein 3	PGY3	2
Phosphatidylinositol glycan, class A (paroxysmal nocturnal hemoglobinuria)	PIGA	6
Phosphatidylinositol transfer protein	PITPN	6
Phosphofructokinase, muscle	PFKM	1
Phosphoglucose isomerase	GPI	1
Phospholipase A2, group IO	PLA2GIO	4
Phospholipase A2, group 1 B	PLA2G 1 B	4
Phospholipase A2, group 2A	PLA2G2A	4
Phospholipase A2, group 2B	PLA2G2B	4
Phospholipase A2, group 4A	PLA2G4A	4
Phospholipase A2, group 4C	PLA2G4C	4
Phospholipase A2, group 5	PLA2G5	4
Phospholipase A2, group 6	PLA2G6	4
Phospholipase C alpha		4
Phospholipase C beta		4
Phospholipase C delta	PLCD1	4
Phospholipase C epsilon		4
Phospholipase C gamma	PLCG	4
Phosphomannomutase-2	PMM2	2
Phosphoribosyl pyrophosphate synthetase	PRPS1	1
Phosphorylase kinase, alpha 2	PHKA2	1
Phytanoyl-CoA hydroxylase	PHYH	6
Plasminogen	PLG	1
Plasminogen activator inhibitor 1	PAI 1	1
Plasminogen activator inhibitor 2	PA 2	1
Plasminogen activator receptor, Urokinase	UPAR; PLAUR	3
Plasminogen activator, Tissue	PLAT; TPA	1
Plasminogen activator, Urokinase	UPA; PLAU	1
Platelet derived growth factor	PDGF	6
Platelet derived growth factor receptor	PDGFR	6
Platelet glutaminase	GLS	2
Platelet glycoprotein I b, alpha	GPI BA	
Platelet glycoprotein I b, beta	GPIBB	
Platelet glycoprotein I b, gamma	GPLBG	
Platelet glycoprotein IX	GP9	
Platelet glycoprotein V	GP5	
Platelet monamine oxidase		2
Platelet-activating factor acetylhydrolase 1 B	PAFAH1b1	4
PLSI		
Platelet-activating factor acetylhydrolase 2	PAFAH2	4
Platelet-activating factor receptor	PAFR	4
Poly (ADP-ribose) synthetase	PARS	F
Polycystic kidney and hepatic disease 1	PKHDL	2
Polycystin 1	PKDL	2
Polycystin 2	PKD2	2
Potassium inwardly-rectifying channel J1	KCNJL	5

Potassium inwardly-rectifying channel J1	KCNJ1	5
Potassium voltage-gated channel A1	KCNAL	5
Potassium voltage-gated channel E1	KCNE1	5
Potassium voltage-gated channel Q1	KCNQ1	5
Potassium voltage-gated channel Q2	KCNQ2	5
Potassium voltage-gated channel Q3	KCNQ3	5
POU domain, class 1, transcription factor 1 (Piti)	POU1F1	6
Prekallikrein		
Procollagen N-protease receptor)		1
Pro-melanin-concentrating hormone	PMCH	6
Proopiomelanocortin	POMC	5
Prostaglandin (PG) D synthase, hematopoietic	PGDS	1
Prostaglandin E2 receptor		
Prostaglandin-endoperoxidase synthase 2	PTGS2	6
Protease inhibitor 1		2
Protease nexin 2	PN2	1
Protective protein for beta-galactosidase	PPGB	1
Protein C	PROC	
Protein C inhibitor	PCI	
Protein S	PROS1	
Prothrombin precursor	F2	
Protoporphyrinogen oxidase	PPOX	1
Purine nucleoside phosphorylase	NP	1
Purinergic receptor P1A1		5
Purinergic receptor P1A2		5
Purinergic receptor P1A3		5
Purinergic receptor P2X, 1	P2RX1	5
Purinergic receptor P2X, 2	P2RX2	5
Purinergic receptor P2X, 3	P2RX3	5
Purinergic receptor P2X, 4	P2RX4	5
Purinergic receptor P2X, 5	P2RX5	5
Purinergic receptor P2X, 6	P2RX6	5
Purinergic receptor P2X, 7	P2RX7	5
Purinergic receptor P2Y, 1	P2RY1	5
Purinergic receptor P2Y, I 1	P2RY1	5
Purinergic receptor P2Y, 2	P2RY2	5
Pyruvate carboxylase	PC	1
Pyruvate decarboxylase	PDHA	1
Pyruvate kinase	PKLR	1
Radixin	RDX	3
Renin	REN	1
Replication factor C	RFC2	1
Retinoic acid receptor, alpha	RARA	6
Retinoic acid receptor, beta	RARB	6
Retinoic acid receptor, gamma	RARG	6

Retinoid X receptor, alpha	RXRA	6
Retinoid X receptor, beta	RXRB	6
Retinoid X receptor, gamma	RXRG	6
Rhesus blood group, CcEe antigens	RHCE	2
Rhesus blood group, D antigen	RHD	2
Rhesus blood group-associated glycoprotein	RHAG	2
Ribosomal protein S19	RPS19	1
RIGUI	RIGUI	6
SIOO calcium-binding protein A1	SIOOAI	5
S 1 00 calcium-binding protein A2	S I 00A2	5
SI 00 calcium-binding protein A3	S 1 00A3	5
SIOO calcium-binding protein A7	S 1 00A7	5
SI 00 calcium-binding protein A8	S I 00A8	5
SIOO calcium-binding protein B	SIOOB	5
SIOO calcium-binding protein P	sloop	5
SA homolog	SAH	6
SAP (SLAM-associated protein)	SH2D1A	4
Secretase, alpha		5
Secretase, beta		5
Secretase, gamma		5
Selectin E	SELE	5
Selectin L	SELL	5
Selectin P	SELP	5
Serotonin receptor, 5HT1A	HTR1A	5
Serotonin receptor, 5HT1B	HTR1B	5
Serotonin receptor, 5HT1C	HTR1C	5
Serotonin receptor, 5HT1 D	HTR1D	5
Serotonin receptor, 5HT1 E	HTRL E	5
Serotonin receptor, 5HT1 F	HTRL F	5
Serotonin receptor, 5HT2A	HTR2A	5
Serotonin receptor, 5HT2B	HTR2B	5
Serotonin receptor, 5HT2C	HTR2C	5
Serotonin receptor, 5HT3	HTR3	5
Serotonin receptor, 5HT4	HTR4	5
Serotonin receptor, 5HT5	HTR5	5
Serotonin receptor, 5HT6	HTR6	5
Serotonin receptor, 5HT7	HTR7	5
Serum amyloid A	SAA	2
Serum amyloid P	SAP	2
Sjogren (Sjogren) syndrome antigen A1	SSAI	4
Sodium channel, non-voltage gated 1, alpha	SCNNLA	5
Sodium channel, non-voltage gated 1, beta	SCNN1 B	5
Sodium channel, non-voltage gated 1, gamma	SCNNLG	5
Sodium channel, voltage gated, type IV, alpha polypeptide	SCN4A	5

Sodium channel, voltage gated, type V, alpha SCN5A polypeptide		5
Sodium channel, voltage-gated, type I, beta SCN1B polypeptide		5
Solute carrier family 1 (glutamate transporter), member 1	SLC1A1	2
Solute carrier family 1 (glutamate transporter), member 2	SLC1A2	2
Solute carrier family 10 (sodium/bile acid cotransporter family), member 1	SLC10A1	2
Solute carrier family 10 (sodium/bile acid cotransporter family), member 2	SLC10A2	2
Solute carrier family 12, member 1	SLC12A1	2
Solute carrier family 12, member 2	SLC12A2	2
Solute carrier family 12, member 3	SLC12A3	2
Solute carrier family 2 (facilitated glucose transporter), member 1	SLC2A1	2
Solute carrier family 2 (facilitated glucose transporter), member 2	SLC2A2	2
Solute carrier family 2 (facilitated glucose transporter), member 3	SLC2A3	2
Solute carrier family 2 (facilitated glucose transporter), member 4	SLC2A4	2
Solute carrier family 2 (facilitated glucose transporter), member 5	SLC2A5	2
Solute carrier family 21, member 2	SLC21A2	2
Solute carrier family 21, member 3	SLC21A3	2
Solute carrier family 22, member 5	SLC22A5	2
Solute carrier family 3 (facilitated glucose transporter), member 1	SLC3A1	2
Solute carrier family 4 (anion exchanger), member 1	SLC4A1	2
Solute carrier family 4 (anion exchanger), member 2	SLC4A2	2
Solute carrier family 4 (anion exchanger), member 3	SLC4A3	2
Solute carrier family 5 (sodium/glucose transporter), member 1	SLC5A1	2
Solute carrier family 5 (sodium/glucose transporter), member 2	SLC5A2	2
Solute carrier family 5 (sodium/glucose transporter), member 5	SLC5A5	2
Solute carrier family 5, member 3	SLC5A3	2
Solute carrier family 6 (GAMMA-AMINOBUTYRIC ACID transporter), member 1	SLC6A1	2
Solute carrier family 6 (neurotransmitter transporter, dopamine), member 3	SLC6A3	2
Solute carrier family 6 (neurotransmitter transporter, noradrenaline), member 2	SLC6A2	2

Solute carrier family 6 (neurotransmitter transporter, serotonin), member 4	SLC6A4	2
Solute carrier family 8 (sodium/calcium exchanger), member 1	SLC8A1	2
Sonic hedgehog, SHH	SHH	6
So@cin	SRI	2
Spectrin alpha	SPTAI	3
Spectrin beta	SPTB	3
Sphingomyelinase	SMPD1	1
Stem cell factor	SCF	6
Steroid 5 alpha reductase 1	SRD5A1	1
Steroid 5 alpha reductase 2	SRD5A2	1
Steroidogenic acute regulatory protein	STAR	2
Sterol carrier protein 2	SCP2	2
Succinate dehydrogenase I	SDHL	1
Succinate dehydrogenase 2	SDH2	1
Succinate thiokinase		1
Superoxide dismutase 1	SODI	1
Superoxide dismutase 3	SOD3	1
Surfeit I	SURF1	6
Synapsin I a& b	SYNI	5
Synapsin 2a & 2b	SYN2	5
Synaptic vesicle amine transporter	8VAT	5
Synaptobrevin 1	SYBI	5
Synaptobrevin 2	SYB2	5
Synaptogyrin		5
Synaptophysin	SYP	5
Synaptosomal-associated protein, 25KD	SNAP25	5
Synaptotagmin I	SyTi	5
Synaptotagmin 2	SYT2	5
Syntaxin I	STX1	5
Talin	TLN	6
T-BOX 1	TBXL	6
T-BOX 3	TBX3	6
TEK, tyrosine kinase, endothelial	TEK	1
Terminal deoxynucleotidyltransferase	TDT	4
Tetranectin	TNA	2
Thiolase, peroxisomal		1
Thiopurine S-methyltransferase	TPMT	1
Thrombin receptor	F2R	
Thrombomodulin	THBD	
Thrombopoietin	THPO	6
Thrombospondin	THBSI	6
Thromboxane A synthase 1	TBXASI	
Thromboxane A2	TXA2	
Thromboxane A2 receptor	TBXA2R	
Thy-I T-cell antigen	THYI	



Thymic humoral factor		
Thymopoietin	TMPO	6
Thymosin		4
Thyroid hormone receptor, alpha	THRA	6
Thyroid hormone receptor, beta	THRB	6
TIE receptor tyrosine kinase	TIE-1	6
Tip-associated protein	TAP	4
Tissue inhibitor of metalloproteinase 1, TIMP1	TIMP1	1
Tissue inhibitor of metalloproteinase 2, TIMP2	TIMP2	1
Tissue inhibitor of metalloproteinase 3, TIMP3	TIMP3	1
Tissue inhibitor of metalloproteinase 4, TIMP4	TIMP4	1
Topoisomerase I		1
Torticollis, keloids, cryptorchidism and renal dysplasia gene	TKCR	6
Transcobalamin 2, TCN2	TCN2	2
Transcription factor 2, hepatic	TCF2	6
Transferrin	TF	6
Transferdn receptor	TFRC	6
Transforming growth factor, beta 2	TGFB2	6
Transforming growth factor, beta induced	TGFBI	6
Transforming growth factor, beta receptor 2	TGFBR2	6
Transtocation in renal carcinoma on chromosome 8 gene	TRC8	6
Transthyretin	TTR	2
Triosephosphate isomerase	TP11	1
Tropomyosin 1 alpha	TPM1	3
Troponin C		3
Troponin I	TNNI3	3
Troponin T2, cardiac	TNNT2	3
Tuberous sclerosis 1	TSC1	6
Tuberous sclerosis 2	TSC2	6
Tumour necrosis factor (TNF) receptor associated. factor 1	TRAF1	
Tumour necrosis factor (TNF) receptor associated factor 2	TRAF2.	
Tumour necrosis factor (TNF) receptor associated factor 3	TRAF3	
Tumour necrosis factor (TNF) receptor associated factor 4	TRAF4	
Tumour necrosis factor (TNF) receptor associated factor 5	TRAF5	
Tumour necrosis factor (TNF) receptor associated factor 6	TRAF6	

Tumour necrosis factor alpha	TNFA	
Tumour necrosis factor alpha receptor	TNFAR	
Tumour necrosis factor beta	TNFB	
Tumour necrosis factor beta receptor	TNFBR	
Tumour protein p53	TP53,P53	6
Tumour protein p63	TP63	6
Tyrosine hydroxylase	TH	1
Ubiquitin		6
Ubiquitin B	UBB	6
Ubiquitin C	UBC	6
UDP-glucose pyrophosphorylase		1
UDP-glucuronosyltransferase 1	ugtld, UGTI	1
UDP-glucuronosyltransferase 2	UGT2	1
Uncoupling protein I		2
Uncoupling protein 3	UCP3	2
Undulin I	COL14A1	3
Uridinediphosphate(UDP)-galactose-4-epimerase	GALE	1
Uroporphyrinogen III synthase	UROS	1
Vacuolar proton pump, subunit 1	VPPI	5
Vacuolar proton pump, subunit 3	VPP3	5
Vascular endothelial growth factor	VEGF	6
Vasoactive intestinal polypeptide	VIP	5
Vasoactive intestinal polypeptide receptor	VIPR	5
Vasoinhibitory peptide		6
Vimentin	vim	4
Vinculin		3
Vitamin D receptor	VDR	6
Von Hippel-Lindau gene	VHL	6
Von Willebrand factor	VWF	2
Werner syndrome helicase	WRN	6
Wiskott-Aldrich syndrome protein	WASP, THC	4
Wolf-Hirschhorn syndrome candidate 1 gene	WHSCI	6
Wolfram syndrome I gene	WFS1	3
Xanthine dehydrogenase	XDH	1
Zinc finger protein 3	ZIC3	3,

Legende für die Spalte Proteinfunktion:

1	Enzym	2	Transport und Lagerung
3	Struktur	4	Immunität
5	Nervale Transmission	6	Wachstum und Differenzierung

**Tabelle 9****Fehlfunktion, Schädigung oder Erkrankung des Gastrointestinaltrakts**

<b>Liste der Gene</b>	<b>HUGO Gensymbol</b>	<b>Protein- funktion</b>
11beta hydroxysteroid dehydrogenase 2	HSD11B2	1
17beta hydroxysteroid dehydrogenase 1	HSD17B1	1
17beta hydroxysteroid dehydrogenase 3	HSD17B3	1
17beta hydroxysteroid dehydrogenase 4	HSD17B4	1
17beta hydroxysteroid oxidoreductase		1
2,3-Bisphosphoglycerate mutase	BPGM	1
3 beta Hydroxysteroid dehydrogenase 2	HSD3B2	1
6-Phosphofructo-2-kinase	PFKFB1	1
Acetoacetyl 1-CoA-thiolase	ACAT1	1
Acetoacetyl 2-CoA-thiolase	ACAT2	1
Acetyl CoA carboxylase	ACC	1
Acetyl CoA carboxylase alpha	ACACA	1
Acetylcholine receptor, nicotinic, gamma	CHRNA7	5
Acetylcholinesterase	ACHE	1
Acid phosphatase 2, lysosomal	ACP2	1
Actin, alpha, cardiac	ACTC	3
Actin, alpha, skeletal	ACTA1	3
Actin, alpha, smooth, aortic	ACTA2	3
Actin, beta	ACTB	3
Actin, gamma 2	ACTG2	3
Acyl CoA dehydrogenase, long chain	ACADL	1
Acyl CoA dehydrogenase, medium chain	ACADM	1
Acyl CoA dehydrogenase, short chain	ACADS	1
Acyl CoA dehydrogenase, very long chain	ACADVL	1
Acyl CoA synthetase, long chain, 1	LACS1	1
Acyl CoA synthetase, long chain, 2	LACS2	1
Acyl CoA synthetase, long chain, 4	ACS4	1
Acyl malonyl condensing enzyme		1
Acyl-CoA thioesterase		1
Adaptin, beta 3A	ADTB3A	2
Adenine phosphoribosyltransferase	APRT	2
Adenomatous polyposis coli tumour suppressor gene	APC	6
Adenosine receptor A1	ADORA1	5
Adenosine receptor A2A	ADORA2A	5
Adenosine receptor A2B	ADORA2B	5
Adenosine receptor A3	ADORA3	5
Adenylate cyclase 1	ADCY1	1
Adenylate cyclase 2	ADCY2	1
Adenylate cyclase 3	ADCY3	1
Adenylate cyclase 4	ADCY4	1

Adenylate cyclase 5	ADCY5	1
Adenylate cyclase 6	ADCY6	1
Adenylate cyclase 7	ADCY7	1
Adenylate cyclase 8	ADCY8	1
Adenylate cyclase 9	ADCY9	1
Adrenergic receptor, alpha1	ADRA1	5
Adrenergic receptor, alpha2	ADRA2	5
Adrenergic receptor, beta1	ADRB1	5
Adrenergic receptor, beta2	ADRB2	5
Adrenergic receptor, beta3	ADRB3	5
Adrenocorticotrophic hormone (ACTH) receptor	ACTHR	6
Alanine aminotransferase		2
Alanine-glyoxylate aminotransferase	AGXT	1
Albumin, ALB	ALB	2
Alcohol dehydrogenase 1	ADH1	1
Alcohol dehydrogenase 2	ADH2	1
Alcohol dehydrogenase 3	ADH3	1
Alcohol dehydrogenase 4	ADH4	1
Alcohol dehydrogenase 5	ADH5	1
Alcohol dehydrogenase 6	ADH6	1
Alcohol dehydrogenase 7	ADH7	1
Aldehyde dehydrogenase 1	ALDH1	1
Aldehyde dehydrogenase 2	ALDH2	1
Aldehyde dehydrogenase 5	ALDH5	1
Aldehyde dehydrogenase 6	ALDH6	1
Aldehyde dehydrogenase 7	ALDH7	1
Aldolase A	ALDOA	1
Aldolase B	ALDOB	1
Aldolase C	ALDOC	1
Aldose reductase		2
Aldosterone receptor	MLR	6
Alkaline phosphatase, liver/bone/kidney	ALPL	2
Alpha 2 macroglobulin	A2M	4
alpha1-Antitrypsin	PI	1
alpha2-Antiplasmin	PLI	1
alpha-Actinin 2	ACTN2	6
alpha-Actinin 3	ACTN3	6
alpha-Amylase		1
alpha-Dextrinase		1
alpha-Galactosidase A	GLA	1
alpha-Ketoglutarate dehydrogenase		1
alpha-L-Iduronidase	IDUA	1
Aminomethyltransferase	AMT	1
Aminopeptidase P	XPNPEP2	1
Amphiregulin	AREG	6
Amylo-1,6-glucosidase	AGL	1

Angiopoietin 1	ANGPT1	6
Angiopoietin 2	ANGPT2	6
Angiotensin converting enzyme	ACE, DCPI	1
Angiotensin receptor 1	AGTR1	2
Angiotensin receptor 2	AGTR2	2
Angiotensinogen	AGT	1
Antidiuretic hormone receptor	ADHR	2
Antithrombin III	AT3	1
AP-2, alpha	TFAP2A	6
AP-2, beta	TFAP2B	6
AP-2, gamma	TFAP2C	6
Apolipoprotein A I	APOA1	2
Apolipoprotein A II	APOA2	2
Apolipoprotein B	APOB	2
Apolipoprotein C1	APOC1	2
Apolipoprotein C2	APOC2	2
Apolipoprotein C3	APOC3	2
Apolipoprotein D	APOD	2
Apolipoprotein E	APOE	2
Apolipoprotein H	APOH	2
Aquaporin 1	AQP1	2
Aquaporin 2	AQP2	2
Arginine vasopressin	AVP	5
Arginine vasopressin receptor 1A	AVPR1A	5
Arginine vasopressin receptor 1B	AVPR1B	5
Arginine vasopressin receptor 2	AVPR2	5
Arginosuccinate lyase	ASL	1
Arginosuccinate synthetase	ASS	1
Aryl hydrocarbon receptor nuclear translocator	ARNT	2
Arylsulfatase A	ARSA	1
Arylsulfatase B	ARSB	1
Aspartate transaminase		2
Aspartylglucosaminidase	AGA	1
Ataxia telangiectasia gene, AT	ATM	6
ATP/ADP translocase		1
Atrial natriuretic peptide	ANP	6
Atrial natriuretic peptide receptor A	NPR1	6
Atrial natriuretic peptide receptor B	NPR2	6
Atrial natriuretic peptide receptor C	NPR3	6
Autoimmune regulator, AIRE	AIRE	4
Azoospermia factor 1	AZF1	6
beta 2 Microglobulin	B2M	4
beta-Galactosidase	GLB1	1
beta-Glucosidase, neutral		1
beta-Glucuronidase	GUSB	1
beta-Ketoacyl reductase		1

Bile acid coenzyme A: amino acid N-Acyltransferase	BAAT	1
Bile salt export pump	BSEP, PFIC2	2
Bile salt-stimulated lipase	CEL	1
Bilirubin UDP-glucuronosyltransferase		1
Biliverdin reductase		2
Bradykinin receptor B1		4
Bradykinin receptor B2		4
Branched chain keto acid dehydrogenase E1, alpha polypeptide	BCKDHA	1
Branched chain keto acid dehydrogenase E1, beta polypeptide	BCKDHB	1
Brush border guanylyl cyclase		1
Ca(2+) transporting ATPase, fast twitch	ATP2A1	2
Ca(2+) transporting ATPase, slow twitch	ATP2A2	2
Cadherin E	CDH1	6
Cadherin EP		6
Cadherin N	CDH2	6
Cadherin P	CDH3	6
Calcitonin/Calcitonin gene-related peptide alpha	CALCA	5
Calcium channel, voltage-dependent, Alpha 1F subunit	CACNA 1F	5
Calcium channel, voltage-dependent, Alpha-1 B (CACNL1A5)	CACNA 1B	5
Calcium channel, voltage-dependent, Alpha-1 C	CACNA 1C	5
Calcium channel, voltage-dependent, Alpha-1 D	CACNA 1D	5
Calcium channel, voltage-dependent, Alpha-1 E (CACNL1A6)	CACNA 1E	5
Calcium channel, voltage-dependent, Alpha-2/delta	CACNA2	5
Calcium channel, voltage-dependent, Beta 1	CACNB1	5
Calcium channel, voltage-dependent, Beta 3	CACNB3	5
Calcium channel, voltage-dependent, Neuronal, Gamma	CACNG2	5
Calcium channel, voltage-dependent, T-type		5
Calcium sensing receptor	CASR	2
Calmodulin 1	CALM1	6
Calmodulin 2	CALM2	6
Calmodulin 3	CALM3	6
Calmodulin dependent kinase		2
Calmodulin-dependant protein kinase II	CAMK2A	6
Calnexin	CANX	6
Canalicular multispecific organic anion transporter	CMOAT	2

Carbamoylphosphate synthetase 1	CPS1	1
Carbamoylphosphate synthetase 2	CPS2	1
Carbonic anhydrase 3	CA3	1
Carbonic anhydrase 4	CA4	1
Carbonic anhydrase, alpha	CA1	1
Carbonic anhydrase, beta	CA2	1
Carboxylesterase 1	CES1	1
Carboxypeptidase	CPN	1
Camitine acylcarnitine translocase	CACT	1
Carnitine palmitoyltransferase I	CPT1A	1
Carnitine palmitoyltransferase II	CPT2	1
Carnitine transporter protein	CDSP, SCD	2
Cartilage-hair hypoplasia gene	CHH	5
Catalase	CAT	4
Cathepsin B		1
Cathepsin D		1
Cathepsin E		1
Cathepsin G	CTSG	1
Cathepsin H		1
Cathepsin K	CTSK	1
Cathepsin L		1
Cathepsin S		1
CD1	CD1	4
CD4	CD4	4
Cell adhesion molecule, intercellular, ICAM	ICAM1	6
Cell adhesion molecule, leukocyte-endothelial, LECAM (CD62)	LECAM1	6
Cell adhesion molecule, liver, LCAM	LCAM	6
Cell adhesion molecule, neural, NCAM1	NCAM1	6
Cell adhesion molecule, neural, NCAM2	NCAM2	6
Cell adhesion molecule, platelet-endothelial, PECAM	PECAM1	6
Cell adhesion molecule, vascular, VCAM	VCAM1	6
c-erbB2	FRBB2	6
c-erbB3	ERBB3	6
c-erbB4	ERBB4	6
Ceruloplasmin precursor	CP	1
Chemokine receptor CCR2	CCR2	4
Chemokine receptor CCR3	CCR3	4
Chemokine receptor CCR5	CCR5	4
Chemokine receptor CXCR4	CXCR4	4
Chitotriosidase	CHIT	1
Chloride channel 5	CLCN5	3
Chloride channel KB	CLCNKB	3
Cholecystokinin	CCK	5
Cholecystokinin B receptor	CCKBR	5

Cholestasis, progressive familial intrahepatic 1 gene	FIC1	6
Cholesterol ester hydroxylase		1
Choline acetyltransferase	CHAT	1
Chromogranin A	CHGA	6
Chymotrypsinogen		1
Citrate synthase		1
Clathrin		2
Clusterin	CLU	6
CoA transferase		1
Cockayne syndrome gene, CKN1	CKN1	6
Collagen I alpha 1	COL1A1	3
Collagen I alpha 2	COL1A2	3
Collagen II alpha 1	COL2A1	3
Collagen III alpha 1	COL3A1	3
Collagen IV alpha 1	COL4A1	3
Collagen IV alpha 2	COL4A2	3
Collagen IV alpha 3	COL4A3	3
Collagen IV alpha 4	COL4A4	3
Collagen IV alpha 5	COL4A5	3
Collagen IV alpha 6	COL4A6	3
Collagen IX alpha 2	COL9A2, EDM2	3
Collagen IX alpha 3	COL9A3	3
Collagen receptor	COLR	3
Collagen V alpha 1	COL5A1	3
Collagen V alpha 2	COL5A2	3
Collagen VI alpha 1	COL6A1	3
Collagen VI alpha 2	COL6A2	3
Collagen VI alpha 3	COL6A3	3
Collagen VII alpha 1	COL7A1	3
Collagen X alpha 1	COL10A1	3
Collagen X alpha 1	COL11A1	3
Collagen XI alpha 2	COL11A2	3
Collagen XVII alpha 1	COL17A1	3
Colony-stimulating factor 1	CSF1	6
Complement component C1 inhibitor	C1 NH	4
Complex I		1
Complex II		1
Complex III		1
Corticotrophin-releasing hormone	CRH	2
Corticotrophin-releasing hormone receptor	CRHR1	2
C-reactive protein CRP		4
Creb binding protein	CREBBP	6
Cu <sup>2+</sup> transporting ATPase beta polypeptide	ATP7B	1
Cubilin	CUBN	2
Cyclic AMP-dependent protein kinase	PKA	1
Cyclic nucleotide phosphodiesterase 1 B	PDE1B	1



Cyclic nucleotide phosphodiesterase 2A3	PDE2A3	1
Cyclic nucleotide phosphodiesterase 3A	PDE3A	1
Cyclic nucleotide phosphodiesterase 3B	PDE3B	1
Cyclic nucleotide phosphodiesterase 4A	PDE4A	1
Cyclic nucleotide phosphodiesterase 4C	PDE4C	1
Cyclic nucleotide phosphodiesterase 5A	PDE5A	1
Cyclic nucleotide phosphodiesterase 6A	PDE6A	1
Cyclic nucleotide phosphodiesterase 6B	PDE6B	1
Cyclic nucleotide phosphodiesterase 7	PDE7	1
Cyclic nucleotide phosphodiesterase 8	PDE8	1
Cyclic nucleotide phosphodiesterase 9A	PDE9A	1
Cyclin F	CCNF	6
Cyclin-dependent kinase 2	CDK2	6
Cyclin-dependent kinase inhibitor 1C (P57, KIP2)	CDKN 1C	6
Cyclooxygenase 1	COX1	1
Cyclooxygenase 2	COX2	1
CYP11A1	CYP11A1	1
CYP11B1	CYP11B1	1
CYP11B2	CYP11B2	1
CYP17	CYP17	1
CYP19	CYP19	1
CYP1A1	CYP1A1	1
CYP1A2	CYP1A2	1
CYP1B1	CYP1B1	1
CYP21	CYP21	1
CYP24	CYP24	1
CYP27	CYP27	1
CYP27B1	PDDR	1
CYP2A1	CYP2A1	1
CYP2A13	CYP2A13	1
CYP2A3	CYP2A3	1
CYP2A6V2	CYP2A6V2	1
CYP2A7	CYP2A7	1
CYP2B6	CYP2B6	1
CYP2C18	CYP2C18	1
CYP2C19	CYP2C19	1
CYP2C8	CYP2C8	1
CYP2C9	CYP2C9	1
CYP2D6	CYP2D6	1
CYP2E1	CYP2E1	1
CYP2F1	CYP2F1	1
CYP2J2	CYP2J2	1
CYP3A3	CYP3A3	1
CYP3A4	CYP3A4	1
CYP3A5	CYP3A5	1
CYP3A7	CYP3A7	1

CYP4A11	CYP4A11	1
CYP4B1	CYP4B1	1
CYP4F2	CYP4F2	1
CYP4F3	CYP4F3	1
CYP51	CYP51	1
CYP5A1	CYP5A1	1
CYP7A	CYP7A	1
CYP8	CYP8	1
Cystathionase	CTH	1
Cystathione beta synthase	CBS	1
Cysteine-rich intestinal protein		2
Cystic fibrosis transmembrane conductance regulator, CFTR	CFTR	5
Cystinosin	CTNS	2
Cytidine deaminase	CDA	1
Cytidine-5-prime-triphosphate synthetase	CTPS	1
Cytochrome a		1
Cytochrome c		1
Cytochrome c oxidase, MTCO		1
Cytokine-suppressive antiinflammatory drug- binding protein 1	CSBPI	4
Cytokine-suppressive antiinflammatory drug- binding protein 2	CSBP2	4
DAX1 nuclear receptor	DAX1	4
Deleted in colorectal carcinoma	DCC	6
Delta aminolevulinate dehydratase	ALAD	1
Delta(4)-3-oxosteroid 5-beta-reductase		1
Delta-7-dehydrocholesterol reductase	DHCR7	1
Dihydrodiol dehydrogenase 1	DDHI	1
Dihydrolipoamide branched chain transacylase	DBT	5
Dihydrolipoamide dehydrogenase	DLD	5
DNA glycosylases		1
Dopamine beta hydroxylase	DBH	1
Dopamine receptors D1	DRD1	5
Dopamine receptors D2	DRD2	5
Dopamine receptors D3	DRD3	5
Dopamine receptors D4	DRD4	5
Dopamine receptors D5	DRD5	5
Dynamin	DNMI	6
Dynein		6
Dystrophia myotonica	DM, DMPK	1
Dystrophia myotonica, atypical	DM2	1
Dystrophin	DMD	3
EBI		6
Elastase I	ELASI	1
Elastase 2	ELAS2	1
Electron-transferring-flavoprotein alpha	ETFA	2

Electron-transferring-flavoprotein beta	ETFB	2
Electron-transferring flavoprotein dehydrogenase	ETFDH	1
Endothelin I	EDN1	5
Endothelin 2	EDN2	5
Endothelin 3	EDN3	5
Endothelin converting enzyme	ECE1	5
Endothelin receptor type A	EDNRA	5
Endothelin receptor type B	EDNRB	5
Enolase	ENO1	1
Enoyl CoA isomerase		1
Enoyl CoA reductase		1
Enteric lipase		2
Enterokinase	PRSS7, ENTK	1
Ephrin receptor tyrosine kinase A	EPHA	6
Ephrin receptor tyrosine kinase B	EPHB	6
Epidermal growth factor	EGF	6
Epidermal growth factor receptor	EGFR	6
Erythrocyte membrane protein band 4.1	EPB41	3
Erythropoietin	EPO	4
Excision repair complementation group 2 protein	ERCC2	1
Excision repair complementation group 2 protein	ERCC3	1
Eyes absent 1	EYAI	6
Facio-genital dysplasia	FGD1, FGDY	2
Factor 1 (No. one)	F1	4
Factor B, properdin		4
Factor D		4
Factor H	HF1	4
Factor I (letter 1)	IF	4
Factor III	F3	4
Factor IX	F9	4
Factor V	F5	4
Factor VII	F7	4
Factor VIII	F8	4
Factor X	F10	4
Factor XI	F11	4
Factor XII	F12	4
Factor XIII A & B	F13A & F13B	4
FADH dehydrogenase		1
Fanconi anemia, complementation group A	FANCA	2
Fanconi anemia, complementation group C	FANCC	2
Fanconi anemia, complementation group D	FANCD	2
Fatty acid binding proteins FABP1		2
Fatty acid binding proteins FABP2	FABP2	2
Fatty acid binding proteins FABP3		2

Fatty acid binding proteins FABP4		2
Fatty acid binding proteins FABP5		2
Fatty acid binding proteins FABP6		2
Ferritin, H subunit		2
Ferritin, L subunit	FTL	2
Fibroblast growth factor	FGF1	6
Fibroblast growth factor receptor 1	FGFR1	6
Fibroblast growth factor receptor 2	FGFR2	6
Fibroblast growth factor receptor 3	FGFR3	6
Fibronectin precursor	FN1	6
Flavin-containing monooxygenase 1	FMOL	1
Flavin-containing monooxygenase 2	FMO2	1
Flavin-containing monooxygenase 3	FMO3	1
Flavin-containing monooxygenase 4	FMO4	1
Folic acid receptor	FOLR	6
Follicle stimulating hormone receptor	FSHR,ODG1	6
Follicle stimulating hormone, FSH	FSHB	6
Forkhead transcription factor I0	FKHL10	6
Forkhead transcription factor 14	FKHL14	6
Fragile site, folic acid type, rare, fra(X) A	FRAXA	5
Fructose-1,6-diphosphatase	FBP1	1
Fucosidase alpha-L-1	FUCA1	1
Fucosidase alpha-L-2		1
Fucosyltransferase 2	FUT2	2
Fucosyltransferase 3	FUT3	2
Fumarase	FH	1
G/T mismatch binding protein	GTBP,MSH6	6
Galactocerebrosidase	GALC	1
Galactose 1-phosphate uridyl-transferase	GALT	1
Galactosyltransferase 1	GT1	6
Galactosyltransferase, alpha 1,3	GGTA1	6
Galactosyltransferase, beta 3	B3GALT	6
Galanin	GAL	5
Galanin receptor	GALNRL	5
Gamma-glutamyltransferase 1	GGT1	2
Gamma-glutamyltransferase 2	GGT2	2
Gap junction protein beta I	GJB1	2
Gastric inhibitory polypeptide GIP	GIP	2
Gastric inhibitory polypeptide receptor, GIPR	GIPR	2
Gastric Intrinsic factor, GIF	GIF	1
Gastric lipase, LIPF		2
Gastrin	GAS	6
Gastrin releasing peptide	GRP	2
Gastrin releasing peptide receptor	GRPR	2
Glial-cell derived neurotrophic factor (GDNF)		5
receptor		
Glial-cell derived neurotrophic factor, GDNF	GDNF	5

Glucagon receptor	GCGR	6
Glucagon synthase		2
Glucagon-like peptide receptor 1	GLP1R	6
Glucokinase	GCK	1
Glucose-6-phosphatase	G6PC	1
Glucose-6-phosphatase translocase	G6PT1	1
Glucose-6-phosphate dehydrogenase	G6PD	1
Glucosidase, acid alpha	GAA	1
Glutamate dehydrogenase	GLUD1	1
Glutamine synthase		1
Glutamine transporter		2
Glutathione	GSH	2
Glutathione peroxidase, GPX2	GPX2	1
Glutathione S-transferase, GSTZ1	GSTZ1	1
Glyceraldehyde-3-phosphate dehydrogenase, GAPDH	GAPDH	1
Glycerol kinase	GK	1
Glycinamide ribonucleotide (GAR) transformylase	GART	1
Glycine dehydrogenase	GLDC	1
Glycogen branching enzyme	GBEI	1
Glycogen phosphorylase	PYGL	1
Glycogen synthase 1 (muscle)	GLYS1	1
Glycogen synthase 2 (liver)	GYS2	1
Glycosyltransferases, ABO blood group	ABO	1
Gonadotropin releasing hormone	GNRH	6
Goosecoid GSC		6
Growth arrest-specific homeobox	GAX	6
Growth hormone receptor	GHR	6
Guanylin	GUCA2	2
H(+), K(+) - ATPase	ATP4B	5
Haem oxygenase		2
Haemoglobin alpha 1	HBA1	2
Haemoglobin alpha 2	HBA2	2
Haemoglobin beta	HBB	2
Haemoglobin delta	HBD	2
Haemoglobin gamma A	HBG1	2
Haemoglobin gamma B	HBG2	2
Haemoglobin gamma G	HBGG	2
Heat shock protein, HSP60		4
Heat shock protein, HSP70		4
Heat shock protein, HSP90		4
Heat shock protein, HSPA1		4
Heat shock protein, HSPA2		4
Heparan sulfamidase		1
Heparin binding epidermal growth factor	HBEGF	6
Heparin Cofactor 11	HCF2	4

Hepatic nuclear factor-3-beta	HNF3B	1
Hepatic nuclear factor-4-alpha	HNF4A	1
Hepatitis B virus integration site 1	HVBS1	
Hepatitis B virus integration site 2	HVBS6	
Hepatocyte growth factor	HGF	6
Hermansky-pudlak syndrome gene	HPS	2
Hexokinase 1	HK1	1
Hexokinase 2	HK2	1
Hexosaminidase A	HEXA,TSD	1
Hexosaminidase B	HEXB	1
Histamine receptors, H1		5
Histamine receptors, H2		5
Histamine receptors, H3		5
Histatin 1		4
Histatin 2		4
Histatin 3	HTN3	4
HLA-B associated transcript I	BAT1	4
HMG-CoA lyase	HMGCL	1
HMG-CoA reductase	HMGCR	1
HMG-CoA synthase	HMGCS2	1
Holocarboxylase synthetase	HLCS	1
Hormone-sensitive lipase	HSL	1
Hydroxyacyl glutathione hydrolase	HAGH	1
Hypoxanthine-guanine phosphoribosyltransferase, HGPRT	HPRT	1
IC7 A and B		4
Iduronate 2 sulphatase	IDS	1
Immunoglobulin E (IgE) responsiveness gene	IGER	4
Immunoglobulin E (IgE) serum concentration regulator gene	IGES	4
Immunoglobulin gamma (IgG) 2	IGHG2	4
Immunoglobulin heavy mu chain	IGHM	4
Immunoglobulin J polypeptide	IGJ	4
Immunoglobulin kappa constant region	IGKC	4
Immunoglobulin kappa variable region	IGKV	4
Inhibin, alpha	INHA	6
Inhibin, beta A	INHBA	6
Inhibin, beta B	INHBB	6
Inhibin, beta C	INHBC	6
Inositol 1,4,5-triphosphate receptor 3	ITPR3	6
Insulin	INS	6
Insulin receptor	INSR	6
Insulin-like growth factor 1	IGF1	6
Insulin-like growth factor 1 receptor	IGFIR	6
Insulin-like growth factor 2	IGF2	6
Insulin-like growth factor 2 receptor	IGF2R	6
Integrin beta 1	ITGBL	6

Integrin beta 2	ITGB2	6
Integrin beta 3	ITGB3	6
Integrin beta 6	ITGB6	6
Integrin, alpha M	ITGAM	6
Integrin, alpha X	ITGAX	6
Inter-alpha-trypsin inhibitor, IATI		1
Interferon alpha	IFNA1	4
Interferon beta	IFNB	4
Interferon gamma	IFNG	4
Interferon gamma receptor 1	IFNGR1	4
Interferon gamma receptor 2	IFNGR2	4
Interferon regulatory factor 1	IRF1	4
Interferon regulatory factor 4	IRF4	4
Interleukin(IL) 1 receptor	IL1R	4
Interleukin(IL) 1, alpha	IL1A	4
Interleukin(IL) 1, beta	IL1B	4
Interleukin(IL) 10	IL10	4
Interleukin(IL) 10 receptor	IL10R	4
Interleukin(IL) 11	IL11	1
Interleukin(IL) 11 receptor	IL11R	4
Interleukin(IL) 12	IL12	4
Interleukin(IL) 12 receptor, beta 1	IL12RBI	4
Interleukin(IL) 13	IL13	4
Interleukin(IL) 13 receptor	IL13R	4
Interleukin(IL) 2	IL2	4
Interleukin(IL) 2 receptor, alpha	IL2RA	4
Interleukin(IL) 2 receptor, gamma	IL2RG	4
Interleukin(IL) 3	IL3	4
Interleukin(IL) 3 receptor	IL3R	4
Interleukin(IL) 4	IL4	4
Interleukin(IL) 4 receptor	IL4R	4
Interleukin(IL) 5	IL5	4
Interleukin(IL) 5 receptor	IL5R	4
Interleukin(IL) 6	IL6	4
Interleukin(IL) 6 receptor	IL6R	4
Interleukin(IL) 7	IL7	4
Interleukin(IL) 7 receptor	IL7R	4
Interleukin(IL) 8	IL8	4
Interleukin(IL) 8 receptor	IL8R	4
Interleukin(IL) 9	IL9	4
Interleukin(IL) 9 receptor	IL9R	4
Interleukin(IL) receptor antagonist 1	IL1RN, IL1RA	4
Intestinal alkaline phosphatase IAP		2
Islet amyloid polypeptide	IAPP	5
Isocitrate dehydrogenase		1
Isovaleric acid CoA dehydrogenase	IVD	1
Kallikrein 3	KAK3	4

Kaliman syndrome gene 1	KAL1	6
Ketohexokinase	KHK	1
ketolase		1
Kininogen, High molecular weight	KNG	4
Kynurenine hydroxylase		1
Kynureninease		1
Lactase		1
Laminin 5, alpha 3	LAMA3	6
Laminin 5, beta 3	LAMB3	6
Laminin 5, gamma 2	LAMC2	6
Laminin M	LAMM	6
Laminin receptor 1	LAMR1	6
Latent transforming growth factor-beta binding protein 2	LTBP2	6
Lecithin-cholesterol acyltransferase	LCAT	1
Leptin	LEP	6
Leptin receptor	LEPR	6
Leukocyte-specific transcript 1	LST-1	4
Leukotriene A4 hydrolase		4
Leukotriene A4 synthase	LTA4S	1
Leukotriene B4 receptor		4
Leukotriene B4 synthase	LTB4S	1
Leukotriene C4 receptor		4
Leukotriene C4 synthase	LTC4S	1
Leukotriene D4/E4 receptor		4
LIM homeobox protein 1	LHX1	6
LIM homeobox transcription factor 1, beta	LMX1B	6
Lipoamide dehydrogenase	OGDH	1
Lipoprotein lipase	LPL	4
Lipoprotein receptor, Low Density	LDLR	2
Lipoprotein, High Density	HDLDT1	2
Lipoprotein, Intermediate Density		2
Lipoprotein, Low Density 1		2
Lipoprotein, Low Density 2		2
Lipoprotein, Very Low Density	VLDLR	2
Low density lipoprotein receptor-related protein precursor	LRP	2
Lymphoid enhancer-binding factor	LEF-1	6
Lysosomal acid lipase	LIPA	1
Lysozyme	LYZ	4
MAD (mothers against decapentaplegic, Drosophila) homologue 4	MADH4	6
MADS box transcription-enhancer factor 2A	MEF2A	6
MADS box transcription-enhancer factor 2B	MEF2B	6
MADS box transcription-enhancer factor 2C	MEF2C	6
MADS box transcription-enhancer factor 2D	MEF2D	6
Malonyl CoA decarboxylase		1



Malonyl CoA transferase		1
Maltase-glucoamylase		1
Mannosidase, alpha B lysosomal	MANB	1
Marenostrin	MEFV	2
MAX-interacting protein 1	mxi I	6
MEK kinase, MEKK		1
Melanocortin 2 receptor	MC2R	2
Melanocortin 4 receptor	MC4R	2
Menin	MEN1	6
Metallothionein		2
Mevalonate kinase	MVK	1
MHC Class 1: A		4
MHC Class 1: B		4
MHC Class 1: C		4
MHC Class 1: LMP-2, LMP-7		4
MHC Class 1: Tap1	ABCR, TAP1	4
MHC Class II: DP	HLA-DPB1	4
MHC Class II: DO		4
MHC Class II: DR		4
MHC Class II: Tap2	TAP2, PSF2	4
MHC Class II: Complementation group A	MHC2TA	4
MHC Class II: Complementation group B	RFXANK	4
MHC Class II: Complementation group C	RFX5	4
MHC Class II: Complementation group D	RFXAP	4
Microsomal triglyceride transfer protein	MTP	2
Mitochondrial trifunctional protein, alpha subunit	HADHA	1
Mitochondrial trifunctional protein, beta subunit	HADHB	1
Molybdenum cofactor synthesis 1	MOCS1	1
Molybdenum cofactor synthesis 2	MOCS2	1
Monoamine oxidase A	MAOA	1
Monoamine oxidase B	MAOB	1
Motilin	MLN	6
Msh homeobox homolog 2	MSX2	6
Mucin 18	MUC18	2
Mucin, MUC2		2
Mucin, MUC5AC		2
Mucin, MUC6		2
Mucopolidoses	GNPTA	1
Mulibrey nanism	MUL	2
Muscarinic receptor, M1	CHRM1	5
Muscarinic receptor, M2	CHRM2	5
Muscarinic receptor, M3	CHRM3	5
Muscarinic receptor, M4	CHRM4	5
Muscarinic receptor, M5	CHRM5	5
Muscle phosphorylase	PYGM	1
Mutated in colorectal cancers, MCC	MCC	6

MutL homolog 1	MLHI	6
MutS homolog 2	MSH2	6
MutS homolog 3	MSH3	6
Myoglobin		2
Myosin 5A	MYO5A	3
Myosin 6	MYO6	3
Myosin 7A	MYO7A	3
Myosin, cardiac	MYH7	3
Myosin, light chain 2	MYL2	3
Myosin, light chain 3	MYL3	3
Myotubularin	MTM1	3
Na <sup>+</sup> , K <sup>+</sup> ATPase, alpha	ATP1A1	6
Na <sup>+</sup> , K <sup>+</sup> ATPase, beta 1	ATP1B1	6
Na <sup>+</sup> , K <sup>+</sup> ATPase, beta 2	ATP1B2	6
Na <sup>+</sup> , K <sup>+</sup> ATPase, beta 3	ATP1B3	6
Na <sup>+</sup> /H <sup>+</sup> exchanger 1	NHE1	2
Na <sup>+</sup> /H <sup>+</sup> exchanger 2	NHE2	2
Na <sup>+</sup> /H <sup>+</sup> exchanger 3	NHE3	2
Na <sup>+</sup> /H <sup>+</sup> exchanger 4	NHE4	2
Na <sup>+</sup> /H <sup>+</sup> exchanger 5	NHE5	2
Na <sup>+</sup> -coupled glucose/galactose transporter		2
N-acetylgalactosamine-6-sulfate sulfatase	GALNS	1
N-acetylglucosamine-6-sulfatase	GNS	1
N-acetylglucosaminidase, alpha	NAGLU	1
NADH dehydrogenase		1
NADH dehydrogenase (ubiquinone) Fe-S protein I	NDUFS1	1
NADH dehydrogenase (ubiquinone) Fe-S protein 4	NDUFS4	1
NADH dehydrogenase (ubiquinone) flavoprotein 1	NDUFV1	1
NADH-cytochrome b5 reductase	DIA1	1
NB6		4
Nephrolithiasis 2	NPHL2	2
Nephronophthisis 1	NPHP1	2
Nephronophthisis 2	NPHP2	2
Nephrosis 1	NPHS1	2
Nerve growth factor	NGF	6
Nerve growth factor receptor	NGFR	6
Neuraminidase sialidase	NEU	2
Neurofibromin 1	NF1	6
Neurofibromin 2	NF2	6
Neurokinin A	NKNA	5
Neurokinin B	NKNB	5
Neurotensin	NTS	5
Neurotensin receptor	NTSR1	5
Notch ligand -jagged I	JAG 1, AGS	6

Nuclear factor I-kappa-B-like gene	IKBL	4
Oncogene ERB		6
Oncogene ERB2		6
Oncogene ERBA		6
Oncogene ERBAL2		6
Oncogene GLI 1	GLI	6
Oncogene GLI2	GLI2	6
Oncogene GLI3	GLI3	6
Oncogene met	MET	6
Oncogene myb	MYB	6
Oncogene myc	MYC	6
Oncogene n-myc		6
Oncogene ret	RET	6
Oncogene r-myc		6
Oncogene sis	PDGFB	6
Oncogene spil		6
Oncogene src		6
Oncogene v-Ki-ras2	KRAS2	6
Orexin	ox	6
Orexin 1 receptor	OX1R	6
Orexin 2 receptor	OX2R	6
Omithine transcarbamoylase	OTC, NME1	1
Osteopontin	OPN	6
Paired box homeotic gene 2	PAX2	6
Paired box homeotic gene 3	PAX3	6
Paired box homeotic gene 6	PAX6	6
Paired box homeotic gene 8	PAX8	6
Palmitoyl-protein thioesterase	PPT	2
Pancreatic amylase		1
Pancreatic colipase		2
Pancreatic lipase	PNLIP	1
Pancreatic lipase related protein 1	PLRP1	1
Pancreatic lipase related protein 2	PLRP2	1
Paraoxonase PON1	PON1	1
Paraoxonase PON2	PON2	1
Paraoxonase PON3		1
Parathyroid hormone	PTH	6
Parathyroid hormone receptor	PTHRI	6
Parathyroid hormone related-peptide	PTHRP	6
Parathyroid hormone-like hormone	PTHLH	6
Parvalbumin	PVALB	6
Patched (Drosophila) homolog, PTCH	PTCH	6
Pepsin		2
Pepsinogen		1
Peptidases A		2
Peptidases B		2
Peptidases C		2

Peptidases D	PEPD	2
Peptidases E		2
Peptidases S		2
Peroxidase, salivary	SAPX	1
Peroxisomal membrane protein 1	PXMP1	3
Peroxisomal membrane protein 3	PXMP3	2
Peroxisome biogenesis factor 1	PEX1	2
Peroxisome biogenesis factor 19	PEX19	2
Peroxisome biogenesis factor 6	PEX6	2
Peroxisome biogenesis factor 7	PEX7	2
Peroxisome receptor 1	PXR1	2
Phenylalanine monooxygenase		1
Phosphatase & tensin homolog	PTEN	6
Phosphate regulating gene with homologies to endopeptidases on the X chromosome	PHEX	6
Phosphoenolpyruvate carboxykinase	PCK1	1
Phosphofructokinase, liver	PFKL	1
Phosphofructokinase, muscle	PFKM	1
Phosphoglucomutase		1
Phosphoglucose isomerase	GPI	1
Phosphoglycerate kinase 1	PGKI	1
Phosphoglycerate mutase 2	PGAM2	1
Phospholipase A2, group 10	PLA2G 10	4
Phospholipase A2, group 1B	PLA2G 1B	4
Phospholipase A2, group 2A	PLA2G2A	4
Phospholipase A2, group 2B	PLA2G2B	4
Phospholipase A2, group 4A	PLA2G4A	4
Phospholipase A2, group 4C	PLA2G4C	4
Phospholipase A2, group 5	PLA2G5	4
Phospholipase A2, group 6	PLA2G6	4
Phospholipase C alpha		4
Phospholipase C beta		4
Phospholipase C delta	PLCD1	4
Phospholipase C epsilon		4
Phospholipase C gamma	PLCG1	4
Phosphomannomutase 2	PMM2	6
Phosphomannomutase 2	PMM2	2
Phosphomannose isomerase 1, PMI1	MPI	2
Phosphoribosyl pyrophosphate synthetase	PRPS1	1
Phosphorylase kinase deficiency, liver	PHK	1
Phosphorylase kinase, alpha 1 (muscle)	PHKA1	1
Phosphorylase kinase, alpha 2	PHKA2	1
Phosphorylase kinase, beta	PHKB	1
Phosphorylase kinase, delta		1
Phosphorylase kinase, gamma 2	PHKG2	1
Plasminogen	PLG	1
Plasminogen activator inhibitor 1	PAI 1	1

Plasminogen activator inhibitor 2	PA12	1
Plasminogen activator receptor, Urokinase	UPAR, PLAUR	3
Plasminogen activator, Tissue	PLAT, TPA	1
Plasminogen activator, Urokinase	UPA, PLAU	1
Platelet derived growth factor	PDGF	6
Platelet derived growth factor receptor	PDGFR	6
Platelet monamine oxidase		2
Platelet-activating factor receptor	PAFR	4
Polycystic kidney and hepatic disease 1	PKHD1	2
Polycystin 1	PKD1	2
Polycystin 2	PKD2	2
Polymorphonuclear elastase		2
Potassium inwardly-rectifying channel J1	KCNJ1	5
Potassium inwardly-rectifying channel J11	KCNJ 11	5
Potassium voltage-gated channel E1	KCNE1	5
Prekallikrein		4
Preproenkephalin	PENK	5
Preproglucagon	GCG, GLPL, GLP2	6
Preproglucagon		2
Preproinsulin		2
Procoliagen N-protease		1
Proline dehydrogenase	PRODH	1
Proline-rich protein BstNI subfamily 1	PRB1	3
Proline-rich protein BstNI subfamily 3	PRB3	3
Proline-rich protein BstNI subfamily 4	PRB4	3
Prolyl-4-hydroxylase		1
Pro-melanin-concentrating hormone	PMCH	6
Proopiomelanocortin	POMC	5
Prosaposin	PSAP	5
Prostacyclin synthase		4
Prostaglandin 15-OH dehydrogenase	HGPD, PGDH	4
Prostaglandin D - DP receptor		4
Prostaglandin E1 receptor		4
Prostaglandin E2 receptor		4
Prostaglandin E3 receptor		4
Prostaglandin F - FP receptor		4
Prostaglandin F2 alpha receptor		4
Prostaglandin 12 receptor		2
Prostaglandin IP receptor		4
Protease inhibitor 1		2
Protective protein for beta-galactosidase	PPGB	1
Protein C	PROC	4
Protein C inhibitor	PCI	4
Protein kinase B	PRKB	4
Protein S	PROSI	4
Protein tyrosine phosphatase, non-receptor type 12	PTPN12	6

Prothrombin precursor	F2	4
Pterin-4-alpha-carbinolamine	PCBD	
Pyruvate carboxylase	PC	1
Pyruvate decarboxylase	PDHA	1
Pyruvate kinase	PKLR	1
Quinoid dihydropteridine reductase	QDPR	1
Renal glutaminase		2
Renin	REN	1
Replication factor C	RFC2	1
Retinoblastoma 1	RB1	6
Retinol binding protein 1		2
Retinol binding protein 2		2
Retinoschisis, X-linked, juvenile	RS	6
RIGUI	RIGUI	6
SA homolog	SAH	6
Salivary amylase, AMY1		2
SAP (SLAM-associated protein)	SH2D1A	4
Secretin	SCT	2
Secretin receptor, SCTR	SCTR	2
Serotonin receptor, 5HT1A	HTR1A	5
Serotonin receptor, 5HT1B	HTR1B	5
Serotonin receptor, 5HT1C	HTR1C	5
Serotonin receptor, 5HT1D	HTR1D	5
Serotonin receptor, 5HT1E	HTR1E	5
Serotonin receptor, 5HT1F	HTR1F	5
Serotonin receptor, 5HT2A	HTR2A	5
Serotonin receptor, 5HT2B	HTR2B	5
Serotonin receptor, 5HT2C	HTR2C	5
Serotonin receptor, 5HT3	HTR3	5
Serotonin receptor, 5HT4	HTR4	5
Serotonin receptor, 5HT5	HTR5	5
Serotonin receptor, 5HT6	HTR6	5
Serotonin receptor, 5HT7	HTR7	5
Sodium channel, non-voltage gated 1, alpha	SCNN1A	5
Sodium channel, non-voltage gated 1, beta	SCNN1B	5
Sodium channel, non-voltage gated 1, gamma	SCNN1G	5
Sodium channel, voltage-gated, type 1, beta polypeptide	SCNLB	5
Solute carrier family 10 (sodium/bile acid cotransporter family), member 1	SLC10A1	2
Solute carrier family 10 (sodium/bile acid cotransporter family), member 2	SLC10A2	2
Solute carrier family 12, member 1	SLC12A1	2
Solute carder family 12, member 2	SLC12A2	2
Solute carrier family 12, member 3	SLC12A3	2
Solute carrier family 14, member 2	SLC14A2	2
Solute carrier family 15 (H+/peptide	SLC15A1	2

transporter, intestinal), member 1		
Solute carrier family 15 (H <sup>+</sup> /peptide transporter, kidney), member 2	SLC15A2	2
Solute carrier family 16 (monocarboxylate transporter), member 1	SLC16A1	2
Solute carrier family 16 (monocarboxylate transporter), member 7	SLC16A7	2
Solute carrier family 17, member 1	SLC17A1	2
Solute carrier family 17, member 2	SLC17A2	2
Solute carrier family 2 (facilitated glucose transporter), member 1	SLC2A1	2
Solute carrier family 2 (facilitated glucose transporter), member 2	SLC2A2	2
Solute carrier family 2 (facilitated glucose transporter), member 3	SLC2A3	2
Solute carrier family 2 (facilitated glucose transporter), member 4	SLC2A4	2
Solute carrier family 2 (facilitated glucose transporter), member 5	SLC2A5	2
Solute carrier family 21, member 2	SLC21A2	2
Solute carrier family 21, member 3	SLC21A3	2
Solute carrier family 22, member 1	SLC22A1	2
Solute carrier family 22, member 2	SLC22A2	2
Solute carrier family 22, member 5	SLC22A5	2
Solute carrier family 3 (facilitated glucose transporter), member 1	SLC3A1	2
Solute carrier family 4 (anion exchanger), member 1	SLC4A1	2
Solute carrier family 4 (anion exchanger), member 2	SLC4A2	2
Solute carrier family 4 (anion exchanger), member 3	SLC4A3	2
Solute carrier family 5 (sodium/glucose transporter), member 1	SLC5A1	2
Solute carrier family 5 (sodium/glucose transporter), member 2	SLC5A2	2
Solute carrier family 5 (sodium/glucose transporter), member 5	SLC5A5	2
Solute carrier family 5, member 3	SLC5A3	2
Solute carrier family 6 (GAMMA-AMINOBUTYRIC ACID transporter), member 1	SLC6A1	2
Solute carrier family 6 (neurotransmitter transporter, dopamine), member 3	SLC6A3	2
Solute carrier family 6 (neurotransmitter transporter, noradrenaline), member 2	SLC6A2	2
Solute carrier family 6, member 6	SLC6A6	2

Solute carrier family 7(amino acid transporters, member 1	SLC7A1	2
Solute carrier family 7(amino acid transporters, member 2	SLC7A2	2
Solute carrier family 7(amino acid transporters, member 7	SLC7A7	2
Somatostatin	SST	5
Somatostatin receptor, SSTR1	SSTR1	5
Somatostatin receptor, SSTR2	SSTR2	6
Somatostatin receptor, SSTR3	SSTR3	5
Somatostatin receptor, SSTR4	SSTR4	5
Somatostatin receptor, SSTR5	SSTR5	5
Sphingomyelinase	SMPD1	1
Steroid 5 alpha reductase 1	SRD5A1	1
Steroid 5 alpha reductase 2	SRD5A2	1
Sterol carrier protein 2	SCP2	2
Substance P		5
Succinyl CoA synthase		1
Sucrase		1
Sucrase-isomaltase	SI	2
Superoxide dismutase 1	SOD1	1
Surfeit I	SURF1	6
Talin	TLN	6
Talin, TLN		3
TATA binding protein	TBP	6
T-BOX 1	TBX1	6
T-BOX 2	TBX2	6
T-BOX 3	TBX3	6
Thiolase, peroxisomal		1
Thrombin receptor	F2R	4
Thrombopoietin	THPO	6
Thromboxane A synthase 1	TBXAS1	4
Tip-associated protein	TAP	4
Topoisomerase I		1
Torticollis, keloids, cryptorchidism and renal dysplasia gene	TKCR	6
Transacylase		1
Transcobalamin 1, TCN1		2
Transcobalamin 2, TCN2	TCN2	2
Transcription factor 1, hepatic	TCF1	6
Transcription factor 2, hepatic	TCF2	6
Transferrin	TF	6
Transferrin receptor	TFRC	6
Transforming growth factor, beta 2	TGFB2	6
Transforming growth factor, beta induced	TGFB1	6
Transforming growth factor, beta receptor 2	TGFR2	6
Transglutaminase 4	TGM4	6



Transketolase	TKT	1
Transketolase-like I	TKTLI	1
Translocation in renal carcinoma on chromosome 8 gene	TRC8	6
Transthyretin	TTR	2
Trehalase		2
Triosephosphate isomerase	TPI 1	1
Trypsin inhibitor		1
Trypsinogen 1	TRY1	1
Trypsinogen 2	TRY2	1
Trypsinogen activation peptide		2
Tuberous sclerosis 1	TSC1	6
Tuberous sclerosis 2	TSC2	6
Tumour necrosis factor (TNF) receptor associated factor 1	TRAF1	4
Tumour necrosis factor (TNF) receptor associated factor 2	TRAF2	4
Tumour necrosis factor (TNF) receptor associated factor 3	TRAF3	4
Tumour necrosis factor (TNF) receptor associated factor 4	TRAF4	4
Tumour necrosis factor (TNF) receptor associated factor 5	TRAF5	4
Tumour necrosis factor (TNF) receptor associated factor 6	TRAF6	4
Tumour necrosis factor alpha	TNFA	4
Tumour necrosis factor alpha receptor	TNFAR	4
Tumour necrosis factor beta	TNFB	4
Tumour necrosis factor beta receptor	TNFBR	4
Tumour protein p53	TP53,P53	6
Tumour protein p63	TP63	6
Tumour suppressor gene DRA	DRA	4
Tyrosinase	TYR	1
UDP-glucose pyrophosphorylase		1
UDP-glucuronosyltransferase 1	ugtld, UGT1	1
UDP-glucuronosyltransferase 2	UGT2	1
Uridinediphosphate(UDP)-galactose-4-epimerase	GALE	1
Uroporphyrinogen decarboxylase	UROD	1
Uroporphyrinogen III synthase	UROS	1
Vasoactive intestinal polypeptide	VIP	5
Vasoactive intestinal polypeptide receptor	VIPR	5
Vasoinhibitory peptide		6
Villin		3
Von Hippel-Lindau gene	VHL	6
Von Willebrand factor	VWF	2
Wiskott-Aldrich syndrome protein	WASP, THC	4

Wolf-Hirschhorn syndrome candidate 1 gene	WHSC1	6
Wolfram syndrome 1 gene	WFS1	3
Xanthine dehydrogenase	XDH	1
Xeroderma pigmentosum, complementation group A	XPA	1
Xeroderma pigmentosum, complementation group B	XPB	1
Xeroderma pigmentosum, complementation group C	XPC	1
Xeroderma pigmentosum, complementation group D		1
Xeroderma pigmentosum, complementation group E		1
Xeroderma pigmentosum, complementation group F	XPF	1
Xeroderma, pigmentosum, complementation group G	ERCC5	1
Zinc finger protein 3	ZIC3	3,

Legende für die Spalte Proteinfunktion:

1	Enzym	2	Transport und Lagerung
3	Struktur	4	Immunität
5	Nervale Transmission	6	Wachstum und Differenzierung

**Tabelle 10**  
**Fehlfunktion, Schädigung oder Erkrankung des Atmungssystems**

Liste der Gene	HUGO Gensymbol	Protein- funktion
11 beta hydroxysteroid dehydrogenase 2	HSD11B2	1
2,3-bisphosphoglycerate mutase	BPGM	1
3 beta hydroxysteroid dehydrogenase 2	HSD3B2	1
Acetoacetyl 1-CoA-thiolase	ACAT1	1
Acetoacetyl 2-CoA-thiolase	ACAT2	1
Acetyl CoA synthase		1
Acetylcholine receptor, nicotinic, gamma	CHRNA7	5
Acetylcholinesterase	ACHE	1
Aconitase		1
Acyl CoA dehydrogenase, long chain	ACADL	1
Acyl CoA dehydrogenase, medium chain	ACADM	1
Acyl CoA dehydrogenase, short chain	ACADS	1
Acyl CoA dehydrogenase, very long chain	ACADVL	1
Adaptin, beta 3A	ADTB3A	2
Adenosine deaminase	ADA	1
Adenosine receptor A1	ADORA1	5
Adenosine receptor A2A	ADORA2A	5
Adenosine receptor A2B	ADORA2B	5
Adenosine receptor A3	ADORA3	5
Adenylate cyclase 1	ADCY1	1
Adenylate cyclase 2	ADCY2	1
Adenylate cyclase 3	ADCY3	1
Adenylate cyclase 4	ADCY4	1
Adenylate cyclase 5	ADCY5	1
Adenylate cyclase 6	ADCY6	1
Adenylate cyclase 7	ADCY7	1
Adenylate cyclase 8	ADCY8	1
Adenylate cyclase 9	ADCY9	1
Adrenergic receptor, alpha1	ADRA1	5
Adrenergic receptor, alpha2	ADRA2	5
Adrenergic receptor, beta1	ADRB1	5
Adrenergic receptor, beta2	ADRB2	5
Adrenergic receptor, beta3	ADRB3	5
Adrenocorticotrophic hormone (ACTH) receptor	ACTHR	6
Albumin, ALB	ALB	2
Alcohol dehydrogenase 1	ADH1	1
Alcohol dehydrogenase 2	ADH2	1
Alcohol dehydrogenase 3	ADH3	1
Alcohol dehydrogenase 4	ADH4	1

Alcohol dehydrogenase 5	ADH5	1
Alcohol dehydrogenase 6	ADH6	1
Alcohol dehydrogenase 7	ADH7	1
Aldolase A	ALDOA	1
Aldolase B	ALDOB	1
Aldolase C	ALDOC	1
Aldosterone receptor	MLR	6
Alpha 2 macroglobulin	A2M	4
Alpha1-antichymotrypsin	AACT	1
alpha1-Antitrypsin	PI	1
alpha2-Antiplasmin	PLI	1
alpha-Actinin 2	ACTN2	6
alpha-Actinin 3	ACTN3	6
alpha-Galactosidase A	GLA	1
alpha-ketoglutarate dehydrogenase		1
Aminopeptidase P	XPNPEP2	1
Amphiregulin	AREG	6
Androgen receptor	AR	6
Angiopoietin 1	ANGPT1	6
Angiopoietin 2	ANGPT2	6
Angiotensin converting enzyme	ACE,DCP1	1
Angiotensin receptor 1	AGTR1	2
Angiotensin receptor 2	AGTR2	2
Angiotensinogen	AGT	1
Annexin 1	ANX 1	1
Antidiuretic hormone receptor	ADHR	2
Antithrombin III	AT3	1
Apolipoprotein E	APOE	2
Arginase	ARG1	1
Arginine vasopressin	AVP	5
Arginine vasopressin receptor 1A	AVPR1A	5
Arginine vasopressin receptor 1 B	AVPR1B	5
Arginine vasopressin receptor 2	AVPR2	5
Arginosuccinate lyase	ASL	1
Arylsulfatase D	ARSD	1
Arylsulfatase E	ARSE	1
Arylsulfatase F	ARSF	1
Aspartate transaminase		2
Ataxia telangiectasia gene, AT	ATM	6
ATP/ADP translocase		1
Atrial natriuretic peptide	ANP	6
Atrial natriuretic peptide receptor A	NPR1	6
Atrial natriuretic peptide receptor B	NPR2	6
Atrial natriuretic peptide receptor C	NPR3	6
beta-galactosidase	GLB1	1
beta-Glucuronidase	GUSB	1
Blotnidase	BTD	1

Bloom syndrome protein	BLM	6
Bradykinin receptor B1		
Bradykinin receptor B2		
Butyrylcholinesterase	BCHE	1
C1 inhibitor		1
Cadherin E	CDH1	6
Cadherin EP		6
Cadherin N	CDH2	6
Cadherin P	CDH3	6
Calcitonin receptor /Calcitonin gene-related peptide receptor	CALCR	5
Calcitonin/Calcitonin gene-related peptide alpha	CALCA	5
Calcium channel, voltage-dependent, alpha 1F subunit	CACNA1F	5
Calcium channel, voltage-dependent, Alpha-1B (CACNL1A5)	CACNAL B	5
Calcium channel, voltage-dependent, Alpha-1 C	CACNA1C	5
Calcium channel, voltage-dependent, Alpha-1 D	CACNA1D	5
Calcium channel, voltage-dependent, Alpha-E (CACNL1A6)	CACNA1E	5
Calcium channel, voltage-dependent, Alpha-2/delta	CACNA2	5
Calcium channel, voltage-dependent, Beta 1	CACNB1	5
Calcium channel, voltage-dependent, Beta 3	CACNB3	5
Calcium channel, voltage-dependent, Neuronal, Gamma	CACNG2	5
Calcium channel, voltage-dependent, T-type		5
Calmodulin 1	CALM1	6
Calmodulin 2	CALM2	6
Calmodulin 3	CALM3	6
Calnexin	CANX	6
Carbonic anhydrase 3	CA3	1
Carbonic anhydrase 4	CA4	1
Carbonic anhydrase, alpha	CA1	1
Carbonic anhydrase, beta	CA2	1
Carnitine acetyltransferase	CRAT	1
Carnitine acylcarnitine translocase	CACT	1
Catalase	CAT	4
Cathepsin B		1
Cathepsin D		1
Cathepsin E		1
Cathepsin G	CTSG	1
Cathepsin H		1
Cathepsin K	CTSK	1

Cathepsin L		1
Cathepsin S		1
CD1	CD1	4
CD4	CD4	4
Cell adhesion molecule, intercellular, ICAM	ICAM1	6
Cell adhesion molecule, leukocyte- endothelial, LECAM (CD62)	LECAM1	6
Cell adhesion molecule, liver, LCAM	LCAM	6
Cell adhesion molecule, neural, NCAM1	NCAM1	6
Cell adhesion molecule, neural, NCAM2	NCAM2	6
Cell adhesion molecule, platelet-endothelial, PECAM1 PECAM		6
Cell adhesion molecule, vascular, VCAM	VCAM1	6
Chemokine receptor CXCR4	CXCR4	4
Chitotriosidase	CHIT	1
Cholecystokinin	CCK	5
Cholecystokinin B receptor	CCKBR	5
Choline acetyltransferase	CHAT	1
Citrate synthase		1
Coenzyme Q (CoQ)/ubiquinone		1
Collagen I alpha 1	COL1A1	3
Collagen I alpha 2	COL1A2	3
Collagen II alpha 1	COL2A1	3
Collagen III alpha 1	COL3A1	3
Collagen IV alpha 1	COL4A1	3
Collagen IV alpha 2	COL4A2	3
Collagen IV alpha 3	COL4A3	3
Collagen IV alpha 4	COL4A4	3
Collagen IV alpha 5	COL4A5	3
Collagen IV alpha 6	COL4A6	3
Collagen IX alpha 2	COL9A2, EDM2	3
Collagen IX alpha 3	COL9A3	3
Collagen receptor	COLR	3
Collagen V alpha 1	COL5A1	3
Collagen V alpha 2	COL5A2	3
Collagen VI alpha 1	COL6A1	3
Collagen VI alpha 2	COL6A2	3
Collagen VI alpha 3	COL6A3	3
Collagen VII alpha 1	COL7A1	3
Collagen X alpha 1	COL10A1	3
Collagen X alpha 1	COL11A1	3
Collagen XI alpha 2	COL11A2	3
Collagen XVII alpha 1	COL17A1	3
Colony-stimulating factor 1	CSF1	6
Colony-stimulating factor 1 receptor	CSF1R	6
Colony-stimulating factor 2	CSF2	6
Colony-stimulating factor 2 alpha receptor	CSF2RA	6

Colony-stimulating factor 2 beta receptor	CSF2RB	6
Colony-stimulating factor 3	CSF3	6
Colony-stimulating factor 3 receptor	CSF3R	6
Complement component C1 inhibitor	C1NH	4
Complement component C1qa	C1QA	4
Complement component C1qb	C1QB	4
Complement component C1qg	C1QG	4
Complement component C1r	C1R	4
Complement component C1s	C1S	4
Complement component C2	C2	4
Complement component C3	C3	4
Complement component C4A	C4A	4
Complement component C4B	C4B	4
Complement component C5	C5	4
Complement component C6	C6	4
Complement component C7	C7	4
Complement component C8	C8B	4
Complement component C9	C9	4
Complement component receptor 1	CR1	4
Complement component receptor 2	CR2	4
Complement component receptor 3	CR3	4
Complex I		1
Complex II		1
Complex III		1
Complex III		1
Complex V	MTATP6	1
Coproporphyrinogen oxidase	CPO	1
Corticotrophin-releasing hormone	CRH	2
Corticotrophin-releasing hormone receptor	CRHR1	2
Cortisol receptor		4
C-reactive protein CRP		4
Creatine kinase - B and m	CKBE	1
Creb binding protein	CREBBP	6
Cu <sup>2+</sup> transporting ATPase alpha polypeptide	ATP7A	1
Cyclic AMP-dependent protein kinase	PKA	1
Cyclic nucleotide phosphodiesterase 1B	PDE1B	1
Cyclic nucleotide phosphodiesterase 1B1	PDE1B1	1
Cyclic nucleotide phosphodiesterase 2A3	PDE2A3	1
Cyclic nucleotide phosphodiesterase 3A	PDE3A	1
Cyclic nucleotide phosphodiesterase 3B	PDE3B	1
Cyclic nucleotide phosphodiesterase 4A	PDE4A	1
Cyclic nucleotide phosphodiesterase 4C	PDE4C	1
Cyclic nucleotide phosphodiesterase 5A	PDE5A	1
Cyclic nucleotide phosphodiesterase 6A	PDE6A	1
Cyclic nucleotide phosphodiesterase 6B	PDE6B	1
Cyclic nucleotide phosphodiesterase 7	PDE7	1
Cyclic nucleotide phosphodiesterase 8	PDE8	1

Cyclic nucleotide phosphodiesterase 9A	PDE9A	1
Cyclin-dependent kinase 2	CDK2	6
Cyclin-dependent kinase inhibitor 2A (p 16)	CDKN2A	6
Cyclooxygenase 1	COX1	1
Cyclooxygenase 2	COX2	1
CYP11A1	CYP11A1	1
CYP11B1	CYP11B1	1
CYP11B2	CYP11B2	1
CYP17	CYP17	1
CYP19	CYP19	1
CYP1A1	CYP1A1	1
CYP1A2	CYP1A2	1
CYP1B1	CYP1B1	1
CYP21	CYP21	1
CYP24	CYP24	1
CYP27	CYP27	1
CYP27B1	PDDR	1
CYP2A1	CYP2A1	1
CYP2A13	CYP2A13	1
CYP2A3	CYP2A3	1
CYP2A6V2	CYP2A6V2	1
CYP2A7	CYP2A7	1
CYP2B6	CYP2B6	1
CYP2C18	CYP2C18	1
CYP2C19	CYP2C19	1
CYP2C8	CYP2C8	1
CYP2C9	CYP2C9	1
CYP2D6	CYP2D6	1
CYP2E1	CYP2E1	1
CYP2F1	CYP2F1	1
CYP2J2	CYP2J2	1
CYP3A3	CYP3A3	1
CYP3A4	CYP3A4	1
CYP3A5	CYP3A5	1
CYP3A7	CYP3A7	1
CYP4A11	CYP4A11	1
CYP4B1	CYP4B1	1
CYP4F2	CYP4F2	1
CYP4F3	CYP4F3	1
CYP51	CYP51	1
CYP5A1	CYP5A1	1
CYP7A	CYP7A	1
CYP8	CYP8	1
Cystathionase	CTH	1
Cystathione beta synthase	CBS	1
Cystic fibrosis transmembrane conductance regulator, CFTR	CFTR	5



Cytidine deaminase	CDA	1
Cytidine-5-prime-tdphosphate synthetase	CTPS	1
Cytochrome a		1
Cytochrome b-5	CYB5	1
Cytochrome c		1
Cytochrome c oxidase, MTCO		1
Cytokine-suppressive antiinflammatory drug- binding protein 1	CSBP1	4
Cytokine-suppressive antiinflammatory drug- binding protein 2	CSBP2	4
DAX1 nuclear receptor	DAX1	4
D-beta-hydroxybutyrate dehydrogenase		1
Delta 4-5 alpha-reductase		1
Desmin	DES	3
Dihydrolipoamide dehydrogenase	DLD	5
DNA glycosylases		1
Dopamine beta hydroxylase	DBH	1
Dopamine receptors D1	DRD1	5
Dopamine receptors D2	DRD2	5
Dopamine receptors D3	DRD3	5
Dopamine receptors D4	DRD4	5
Dopamine receptors D5	DRD5	5
Dystrophin	DMD	3
Elastase 1	ELAS1	1
Elastase 2	ELAS2	1
Elastin	ELN	3
Electron-transferring-flavoprotein alpha	ETFA	2
Electron-transferring-flavoprotein beta	ETFB	2
Electron-transferring flavoprotein dehydrogenase	ETFDH	1
Endothelin 1	EDN1	5
Endothelin 2	EDN2	5
Endothelin 3	EDN3	5
Endothelin converting enzyme	ECE1	5
Endothelin receptor type A	EDNRA	5
Endothelin receptor type B	EDNRB	5
Enolase	EN01	1
Enoyl CoA hydratase		1
Enoyl CoA isomerase		1
Enoyl CoA reductase		1
Enterokinase	PRSS7,ENTK	1
Ephrin receptor tyrosine kinase A	EPHA	6
Ephrin receptor tyrosine kinase B	EPHB	6
Epidermal growth factor	EGF	6
Epidermal growth factor receptor	EGFR	6
Epoxide hydrolase 1, microsomal	EPHX1	1
Estrogen receptor	ESR	6

EWS RNA-binding protein	EWSR1	6
Eyes absent 1	EYA1	6
Faciogenital dysplasia	FGD1, FGDY	2
Factor 1 (No. one)	F1	4
Factor B, properdin		4
Factor D		4
Factor H	HF1	4
Factor I (letter 1)	IF	4
Factor III	F3	4
Factor IX	F9	4
Factor V	F5	4
Factor VII	F7	4
Factor VIII	F8	4
Factor X	F10	4
Factor XI	F11	4
Factor XII	F12	4
Factor XIII A & B	F13A & F13B	4
Fc fragment of IgG, high affinity IA, receptor for	FCG1A	6
Fc fragment of IgG, low affinity IIa, receptor for (CD32)	FCGR2A	6
Fc fragment of IgG, low affinity IIIa, receptor for (CD 1 6)	FCGR3A	6
Fibrillin 1	FBN1	6
Fibrinogen alpha	FGA	3
Fibrinogen beta	FGB	3
Fibrinogen gamma	FGG	3
Fibroblast growth factor	FGF1	6
Fibroblast growth factor receptor 1	FGFR1	6
Fibroblast growth factor receptor 2	FGFR2	6
Fibroblast growth factor receptor 3	FGFR3	6
Fibronectin precursor	FNI	6
Flightless-II, Drosophila homolog of	FLII	6
Follicle stimulating hormone receptor	FSHR, ODGI	6
Follicle stimulating hormone, FSH	FSHB	6
Forkhead rhabdomyosarcoma gene	FKHR	6
Fructose-1,6-diphosphatase	FBP1	1
Furin		2
GABA receptor, alpha 1	GABRA1	5
GABA receptor, alpha 2	GABRA2	5
GABA receptor, alpha 3	GABRA3	5
GABA receptor, alpha 4	GABRA4	5
GABA receptor, alpha 5	GABRA5	5
GABA receptor, alpha 6	GABRA6	5
GABA receptor, beta 1	GABRB1	5
GABA receptor, beta 2	GABRB2	5
GABA receptor, beta 3	GABRB3	5

GABA receptor, gamma 1	GABRG1	5
GABA receptor, gamma 2	GABRG2	5
GABA receptor, gamma 3	GABRG3	5
GABA transaminase	ABAT	1
Galactocerebrosidase	GALC	1
Galactosyltransferase 1	GT1	6
Galactosyltransferase, alpha 1,3	GGTA1	6
Galactosyltransferase, beta 3	B3GALT	6
Glucocorticoid receptor	GRL	6
Glucokinase	GCK	1
Glucosidase, acid alpha	GAA	1
Glutamate dehydrogenase	GLUD1	1
Glutamate receptor 1	GLUR1	5
Glutamate receptor 2	GLUR2	5
Glutamate receptor 3	GLUR3	5
Glutamate receptor 4	GLUR4	5
Glutamate receptor 5	GLUR5	5
Glutamate receptor 6	GLUR6	5
Glutamate receptor 7	GLUR7	5
Glutamate receptor, ionotropic, NMDA 1	NMDAR1	5
Glutamate receptor, ionotropic, NMDA 2A	NMDAR2A	5
Glutamate receptor, ionotropic, NMDA 2B	NMDAR2B	5
Glutamate receptor, ionotropic, NMDA 2C	NMDAR2C	5
Glutamate receptor, ionotropic, NMDA 2D	NMDAR2D	5
Glutathione	GSH	2
Glutathione peroxidase, GPX1	GPX1	1
Glutathione peroxidase, GPX2	GPX2	1
Glutathione reductase, GSR	GSR	1
Glutathione S-transferase mu 1, GSTM1	GSTM1	1
Glutathione S-transferase mu 4, GSTM4		1
Glutathione S-transferase theta 1, GSTT1	GSTT1	1
Glutathione S-transferase theta 2, GSTT2		1
Glutathione S-transferase, GSTP1	GSTP1	1
Glutathione S-transferase, GSTZ1	GSTZ1	1
Glutathione synthetase	GSS	1
Glyceraldehyde-3-phosphate dehydrogenase, GAPDH	GAPDH	1
Glycerol kinase	GK	1
Glycinamide ribonucleotide (GAR) transformylase	GART	1
GM2 ganglioside activator protein, GM2A	GM2A	1
Growth arrest-specific homeobox	GAX	6
Guanylyl cyclase		1
Haemoglobin alpha 1	HBA1	2
Haemoglobin alpha 2	HBA2	2
Haemoglobin beta	HBB	2
Haemoglobin delta	HBD	2

Haemoglobin gamma A	HBG1	2
Haemoglobin gamma B	HBG2	2
Haemoglobin gamma G	HBGG	2
Heat shock protein, HSP60		4
Heat shock protein, HSP70		4
Heat shock protein, HSP90		4
Heat shock protein, HSPA1		4
Heat shock protein, HSPA2		4
Heparin binding epidermal growth factor	HBEGF	6
Heparin Cofactor II	HCF2	4
Hermansky-pudlak syndrome gene	HPS	2
Hexokinase 1	HK1	1
Hexokinase 2	HK2	1
Hexosaminidase A	HEXA,TSD	1
Histamine receptors, H1		5
Histamine receptors, H2		5
Histamine receptors, H3		5
HMG-CoA lyase	HMGCL	1
HMG-CoA reductase	HMGCR	1
HMG-CoA synthase	HMGCS2	1
Holocarboxylase synthetase	HLCS	1
Hyaluronidase		2
Hypoxia inducible factor 1	HIF1A	1
Hypoxia inducible factor 2		1
Immunoglobulin E (IgE) responsiveness gene	IGER	4
Immunoglobulin E (IgE) serum concentration regulator gene	IGES	4
Immunoglobulin gamma (IgG) 2	IGHG2	4
Insulin	INS	6
Insulin receptor	INSR	6
Insulin-like growth factor 1	IGF1	6
Insulin-like growth factor 1 receptor	IGF1R	6
Insulin-like growth factor 2	IGF2	6
Insulin-like growth factor 2 receptor	IGF2R	6
Integrin beta 1	ITGB1	6
Integrin beta 2	ITGB2	6
Integrin beta 5	ITGB5	6
Integrin beta 6	ITGB6	6
Integrin, alpha M	ITGAM	6
Inter-alpha-trypsin inhibitor	IATI	1
Interferon alpha	IFNA1	4
Interferon beta	IFNB	4
Interferon gamma	IFNG	4
Interferon gamma receptor 1	IFNGR1	4
Interferon gamma receptor 2	IFNGR2	4
Interferon regulatory factor 1	IRF1	4
Interferon regulatory factor 4	IRF4	4

Interleukin(IL) 1 receptor	IL1R	4
Interleukin(IL) 1, alpha	IL1A	4
Interleukin(IL) 1, beta	IL1B	4
Interleukin(IL) 10	IL10	4
Interleukin(IL) 10 receptor	IL10R	4
Interleukin(IL) 11	IL11	4
Interleukin(IL) 11 receptor	IL11R	4
Interleukin(IL) 12	IL12	4
Interleukin(IL) 12 receptor, beta 1	IL12RB1	4
Interleukin(IL) 13	IL13	4
Interleukin(IL) 13 receptor	IL13R	4
Interleukin(IL) 2	IL2	4
Interleukin(IL) 2 receptor, alpha	IL2RA	4
Interleukin(IL) 2 receptor, gamma	IL2RG	4
Interleukin(IL) 3	IL3	4
Interleukin(IL) 3 receptor	IL3R	4
Interleukin(IL) 4	IL4	4
Interleukin(IL) 4 receptor	IL4R	4
Interleukin(IL) 5	IL5	4
Interleukin(IL) 5 receptor	IL5R	4
Interleukin(IL) 6	IL6	4
Interleukin(IL) 6 receptor	IL6R	4
Interleukin(IL) 7	IL7	4
Interleukin(IL) 7 receptor	IL7R	4
Interleukin(IL) 8	IL8	4
Interleukin(IL) 8 receptor	IL8R	4
Interleukin(IL) 9	IL9	4
Interleukin(IL) 9 receptor	IL9R	4
Interleukin(IL) receptor antagonist 1	IL1RN, IL1RA	4
Isocitrate dehydrogenase		1
Kallikrein 3	KAK3	4
Kininogen, High molecular weight	KNG	4
Kynureninease		1
Laminin 5, alpha 3	LAMA3	6
Laminin 5, beta 3	LAMB3	6
Laminin 5, gamma 2	LAMC2	6
Laminin M	LAMM	6
Laminin receptor 1	LAMR1	6
Latent transforming growth factor-beta binding protein 2	LTBP2	6
Lecithin-cholesterol acyltransferase	LCAT	1
Leptin	LEP	6
Leptin receptor	LEPR	6
Leukotriene A4 hydrolase		4
Leukotriene A4 synthase	LTA4S	1
Leukotriene B4 receptor		4
Leukotriene B4 synthase	LTB4S	1

Leukotriene C4 receptor		4
Leukotriene C4 synthase	LTC4S	1
Leukotriene D4/E4 receptor		4
LIM homeobox protein 1	LHX1	6
Lipoamide dehydrogenase	OGDH	1
Lipoprotein lipase	LPL	4
Lipoprotein receptor, Low Density	LDLR	2
Lipoprotein, High Density	HDLDT1	2
Lipoprotein, Intermediate Density		2
Lipoprotein, Low Density 1		2
Lipoprotein, Low Density 2		2
Lipoprotein, Very Low Density	VLDLR	2
Lipoxygenase		1
Low density lipoprotein receptor-related protein precursor	LRP	2
Lymphoid enhancer-binding factor	LEF-1	6
Lysosomal acid lipase	LIPA	1
Lysozyme	LYZ	4
MAD (mothers against decapentaplegic, Drosophila) homologue 4	MADH4	6
Malate dehydrogenase, mitochondrial	MDH2	1
Malonyl CoA transferase		1
Mannose binding protein	MBP	4
Mannosidase, alpha B lysosomal	MANB	1
Mannosidase, beta A lysosomal	MANBA	1
Matrix Gla protein	MGP	6
Matrix metalloproteinase 1	MMP1	1
Matrix metalloproteinase 10	MMP10	1
Matrix metalloproteinase 11	MMP11	1
Matrix metalloproteinase 12	MMP12	1
Matrix metalloproteinase 13	MMP13	1
Matrix metalloproteinase 14	MMP14	1
Matrix metalloproteinase 15	MMP15	1
Matrix metalloproteinase 16	MMP16	1
Matrix metalloproteinase 17	MMP17	1
Matrix metalloproteinase 18	MMP18	1
Matrix metalloproteinase 19	MMP19	1
Matrix metalloproteinase 2	MMP2	1
Matrix metalloproteinase 3	MMP3, STMY1	1
Matrix metalloproteinase 4	MMP4	1
Matrix metalloproteinase 5	MMP5	F
Matrix metalloproteinase 6	MMP6	1
Matrix metalloproteinase 7	MMP7	1
Matrix metalloproteinase 8	MMP8	1
Matrix metalloproteinase 9	MMP9	1
Methionine adenosyltransferase	MAT1A, MAT2A	1
Midline I	MID1	6

Mitochondrial trifunctional protein, alpha subunit	HADHA	1
Mitochondrial trifunctional protein, beta subunit	HADHB	1
Monoamine oxidase A	MAOA	1
Monoamine oxidase B	MAOB	1
Muscarinic receptor, M1	CHRM1	5
Muscarinic receptor, M2	CHRM2	5
Muscarinic receptor, M3	CHRM3	5
Muscarinic receptor, M4	CHRM4	5
Muscarinic receptor, M5	CHRM5	5
Myoglobin		2
Myotubularin	MTM1	3
Na <sup>+</sup> , K <sup>+</sup> ATPase, alpha	ATP1A1	6
Na <sup>+</sup> , K <sup>+</sup> ATPase, beta 1	ATP1B1	6
Na <sup>+</sup> , K <sup>+</sup> ATPase, beta 2	ATP1B2	6
Na <sup>+</sup> , K <sup>+</sup> ATPase, beta 3	ATP1B3	6
NADH dehydrogenase		1
NADH dehydrogenase (ubiquinone) Fe-S protein 1	NDUFS1	1
NADH dehydrogenase (ubiquinone) Fe-S protein 4	NDUFS4	1
NADH dehydrogenase (ubiquinone) flavoprotein 1	NDUFV1	1
NADH-cytochrome b5 reductase reductase	DIA1	1
Nebulin	NEB	3
Nephrosis 1	NPHS1	2
Nerve growth factor	NGF	6
Nerve growth factor receptor	NGFR	6
Neuraminidase sialidase	NEU	2
Neuregulin	HGL	6
Neurofibromin 1	NF1	6
Neurofibromin 2	NF2	6
Neurokinin A	NKNA	5
Neurokinin B	NKNB	5
Neuropeptide Y	NPY	5
Neuropeptide Y receptor Y1	NPY1 R	5
Neuropeptide Y receptor Y2	NPY2R	5
Nitric oxide synthase 1, NOS 1	NOS1	1
Nitric oxide synthase 2, NOS2	NOS2	1
Nitric oxide synthase 3, NOS3	NOS3	1
Notch ligand - jagged 1	JAG 1, AGS	6
Nucleoside diphosphate kinase-A	NDPKA	1
Oncogene ELK1	ELK1	6
Oncogene ELK2	ELK2	6
Oncogene sis	PDGFB	6

Omithine delta-aminotransferase	OAT	1
Paired box homeotic gene 6	PAX6	6
Parathyroid hormone	PTH	6
Parathyroid hormone receptor	PTHRI	6
Parathyroid hormone related-peptide	PTHRP	6
Parathyroid hormone-like hormone	PTHLH	6
Patched (Drosophila) homolog, PTCH	PTCH	6
Peroxisomal membrane protein 3	PXMP3	2
Peroxisome biogenesis factor 1	PEX1	2
Peroxisome biogenesis factor 19	PEX19	2
Peroxisome biogenesis factor 6	PEX6	2
Peroxisome biogenesis factor 7	PEX7	2
Peroxisome receptor 1	PXR1	2
Phenylalanine hydroxylase	PAH	1
Phenylalanine monooxygenase		1
Phenylethanolamine N-methyltransferase, PNMT	PNMT	1
Phosphofructokinase, liver	PFKL	1
Phosphofructokinase, muscle	PFKM	1
Phosphoglucomutase		1
Phosphoglucose isomerase	GPI	1
Phosphoglycerate kinase 1	PGK1	1
Phosphoglycerate mutase 2	PGAM2	1
Phospholipase A2, group 10	PLA2G 10	4
Phospholipase A2, group 1B	PLA2G1B	4
Phospholipase A2, group 2A	PLA2G2A	4
Phospholipase A2, group 2B	PLA2G2B	4
Phospholipase A2, group 4A	PLA2G4A	4
Phospholipase A2, group 4C	PLA2G4C	4
Phospholipase A2, group 5	P 2G5	
Phospholipase A2, group 6	PLA2G6	4
Phospholipase C epsilon		4
Pineolytic beta-receptors		1
Plasminogen	PLG	1
Plasminogen activator inhibitor 1	PAI 1	1
Plasminogen activator inhibitor 2	PAI2	1
Plasminogen activator receptor, Urokinase	UPAR;PLAUR	3
Plasminogen activator, Tissue	PLAT;TPA	1
Plasminogen activator, Urokinase	UPA;PLAU	1
Platelet derived growth factor	PDGF	6
Platelet derived growth factor receptor	PDGFR	6
Platelet-activating factor receptor	PAFR	4
Potassium inwardly-rectifying channel J1	KCNJ1	5
Potassium voltage-gated channel E1	KCNE1	5
Prekallikrein		4
Procollagen N-protease receptor)		1



Proliferin	PLF	6
Proopiomelanocortin	POMC	5
Properdin P factor, complement	PFC,PFD	4
Prosaposin	PSAP	5
Prostacyclin synthase		4
Prostaglandin 15-OH dehydrogenase	HGPD; PGDH	4
Prostaglandin D - DP receptor		4
Prostaglandin E1 receptor		4
Prostaglandin E2 receptor		4
Prostaglandin E3 receptor		4
Prostaglandin F - FP receptor		4
Prostaglandin F2 alpha receptor		4
Prostaglandin 12 receptor		2
Prostaglandin IP receptor		4
Protein C	PROC	4
Protein C inhibitor	PCI	4
Protein phosphatase 2, regulatory subunit A, beta isoform	PPP2R1B	1
Protein S	PROS1	4
Prothrombin precursor	F2	4
Pyruvate carboxylase	PC	1
Pyruvate decarboxylase	PDHA	1
Pyruvate kinase	PKLR	1
Quinoid dihydropteridine reductase	QDPR	1
Renin	REN	1
Replication factor C	RFC2	1
Retinoblastoma 1	RB1	6
RIGUI	RIGUI	6
Salivary amylase, AMY1		2
Selectin E	SELE	5
Selectin L	SELL	5
Selectin P	SELP	5
Sedne hydroxymethyltransferase	SHMT	1
Serotonin receptor, 5HT1A	HTR1A	5
Serotonin receptor, 5HT1B	HTR1B	5
Serotonin receptor, 5HT1C	HTR1C	5
Serotonin receptor, 5HT1 D	HTR1D	5
Serotonin receptor, 5HT1 E	HTR1E	5
Serotonin receptor, 5HT1 F	HTR1F	5
Serotonin receptor, 5HT2A	HTR2A	5
Serotonin receptor, 5HT2B	HTR2B	5
Serotonin receptor, 5HT2C	HTR2C	5
Serotonin receptor, 5HT3	HTR3	5
Serotonin receptor, 5HT4	HTR4	5
Serotonin receptor, 5HT5	HTR5	5
Serotonin receptor, 5HT6	HTR6	5
Serotonin receptor, 5HT7	HTR7	5

Sodium channel, non-voltage gated 1, alpha	SCNN1A	5
Sodium channel, non-voltage gated 1, beta	SCNN1B	5
Sodium channel, non-voltage gated 1, gamma	SCNN1G	5
Sodium channel, voltage gated, type IV, alpha polypeptide	SCN4A	5
Sodium channel, voltage-gated, type 1, beta polypeptide	SCN1B	5
Solute carrier family 21, member 2	SLC21A2	2
Solute carrier family 4 (anion exchanger), member 1	SLC4A1	2
Solute carrier family 4 (anion exchanger), member 2	SLC4A2	2
Solute carrier family 4 (anion exchanger), member 3	SLC4A3	2
Solute carrier family 6 (GAMMA-AMINO BUTYRIC ACID transporter), member 1	SLC6A1	2
Solute carrier family 6 (neurotransmitter transporter, dopamine), member 3	SLC6A3	2
Solute carrier family 6 (neurotransmitter transporter, noradrenaline), member 2	SLC6A2	2
Somatostatin receptor, SSTR2	SSTR2	6
Sphingomyelinase	SMPD1	1
Substance P		5
Succinate dehydrogenase 2	SDH2	1
Succinate thiokinase		1
Succinyl CoA synthase		1
Superoxide dismutase 1	SOD1	1
Superoxide dismutase 3	SOD3	1
Surfactant pulmonary-associated protein A1	SFTPA1	2
Surfactant pulmonary-associated protein A2	SFTPA2	2
Surfactant pulmonary-associated protein B	SFTPB	2
Surfactant pulmonary-associated protein C	SFTPC	2
Surfactant pulmonary-associated protein D	SFTPD	2
Surfeit 1	SURF1	6
Survival of motor neuron 1, telomeric	SMN1	2
Talin	TLN	6
T-BOX 2	TBX2	6
T-BOX 3	TBX3	6
TEK, tyrosine kinase, endothelial	TEK	1
Telomerase protein component		1
Thiolase, peroxisomal		1
Thrombin receptor	F2R	4
Thrombomodulin	THBD	4
Thrombopoietin	THPO	6
Thrombospondin	THBS1	6
Thromboxane A synthase 1	TBXAS1	4

Thromboxane A2	TXA2	4
Thromboxane A2 receptor	TBXA2R	4
Thyroglobulin	TG	6
Thyroid hormone receptor, alpha	THRA	6
Thyroid hormone receptor, beta	THRB	6
Thyroid peroxidase	TPO	6
Thyroid receptor auxiliary protein	TRAP	6
Thyroid-stimulating hormone receptor	TSHR	6
Thyroid-stimulating hormone, alpha	TSHA	6
Thyroid-stimulating hormone, beta	TSHB	6
Thyrotropin releasing hormone receptor	TRHR	6
Topoisomerase I		1
Transacylase		1
Transferrin	TF	6
Transferrin receptor	TFRC	6
Transforming growth factor, beta 2	TGFB2	6
Transforming growth factor, beta induced	TGFBI	6
Transforming growth factor, beta receptor 2	TGFBR2	6
Transketolase	TKT	1
Transketolase-like 1	TKTL1	1
Triosephosphate isomerase	TPI 1	1
Trypsin inhibitor		1
Uncoupling protein I		2
Uroporphyrinogen III synthase	UROS	1
Vasoactive intestinal polypeptide receptor	VIPR	5
Vasoinhibitory peptide		6
Vitronectin receptor, alpha	VNRA	2
Von Hippel-Lindau gene	VHL	6
Wolf-Hirschhorn syndrome candidate 1 gene	WHSC1	6
Xanthine dehydrogenase	XDH	1

Legende für die Spalte Proteinfunktion:

1	Enzym	2	Transport und Lagerung
3	Struktur	4	Immunität
5	Nervale Transmission	6	Wachstum und Differenzierung

**Tabelle 11****Verletzung, Entzündung, Infektion, Immunität und/oder Rekonvaleszenz**

<b>Liste der Gene</b>	<b>HUGO Gensymbol</b>	<b>Protein- funktion</b>
5,10-Methylenetetrahydrofolate reductase (NADPH)	MTHFR	1
Acetylcholinesterase	ACHE	1
Acidic amino acid transporter		2
Actin, alpha, cardiac	ACTC	3
Actin, alpha, skeletal	ACTAL	3
Actin, alpha, smooth, aortic	ACTA2	3
Actin, beta	ACTB	3
Actin, gamma 2	ACTG2	3
ADAM (A disintegrin and metalloproteinase)	1 ADAM 1	1
ADAM (A disintegrin and metalloproteinase)	10 ADAM 10	1
ADAM (A disintegrin and metalloproteinase)	11 ADAM 11	1
ADAM (A disintegrin and metalloproteinase)	12 ADAM 12	1
ADAM (A disintegrin and metalloproteinase)	13 ADAM 13	1
ADAM (A disintegrin and metalloproteinase)	14 ADAM 14	1
ADAM (A disintegrin and metalloproteinase)	15 ADAM 15	1
ADAM (A disintegrin and metalloproteinase)	16 ADAM 16	1
ADAM (A disintegrin and metalloproteinase)	17 ADAM 17	1
ADAM (A disintegrin and metalloproteinase)	18 ADAM 18	1
ADAM (A disintegrin and metalloproteinase)	19 ADAM 19	1
ADAM (A disintegrin and metalloproteinase)	2 ADAM 2	1
ADAM (A disintegrin and metalloproteinase)	3A ADAM 3A	1
ADAM (A disintegrin and metalloproteinase)	3B ADAM 3B	1
ADAM (A disintegrin and metalloproteinase)	4 ADAM 4	1
ADAM (A disintegrin and metalloproteinase)	5 ADAM 5	1
ADAM (A disintegrin and metalloproteinase)	6 ADAM 6	1
ADAM (A disintegrin and metalloproteinase)	7 ADAM 7	1
ADAM (A disintegrin and metalloproteinase)	8 ADAM 8	1
ADAM (A disintegrin and metalloproteinase)	9 ADAM 9	1
Adducin, alpha	ADD1	3
Adducin, beta	ADD2	3
Adenosine deaminase	ADA	1
Adenosine receptor A1	ADORA1	5
Adenosine receptor A2A	ADORA2A	5
Adenosine receptor A2B	ADORA2B	5
Adenosine receptor A3	ADORA3	5
Adenylate cyclase 1	ADCY1	1
Adenylate cyclase 2	ADCY2	1
Adenylate cyclase 3	ADCY3	1
Adenylate cyclase 4	ADCY4	1
Adenylate cyclase 5	ADCY5	1

Adenylate cyclase 6	ADCY6	1
Adenylate cyclase 7	ADCY7	1
Adenylate cyclase 8	ADCY8	1
Adenylate cyclase 9	ADCY9	1
Adrenergic receptor, alpha1	ADRA1	5
Adrenergic receptor, alpha2	ADRA2	5
Adrenergic receptor, beta1	ADRB1	5
Adrenergic receptor, beta2	ADRB2	5
Adrenergic receptor, beta3	ADRB3	5
Adrenocorticotrophic hormone (ACTH) receptor	ACTHR	6
Albumin, ALB	ALB	2
Aldosterone receptor	MLR	6
Alpha 1 acid glycoprotein	AAG, AGP	2
Alpha 2 macroglobulin	A2M	4
alpha1-antitrypsin	Pi	1
alpha2-antiplasmin	PLI	1
Alpha-fetoprotein	AFP	6
alpha-glucosidase, neutral AB	GANAB	1
alpha-glucosidase, neutral C	GANC	1
Aminopeptidase P	XPNPEP2	1
Amylo-1,6-glucosidase	AGL	1
Amyloid beta A4 precursor protein	APP	5
Amyloid beta A4 precursor-like protein	APLP	5
Androgen binding protein	ABP	2
Androgen receptor	AR	6
Angiopoietin 1	ANGPT1	6
Angiopoietin 2	ANGPT2	6
Angiotensin converting enzyme	ACE,DCPI	1
Angiotensin receptor 1	AGTRL	2
Angiotensin receptor 2	AGTR2	2
Angiotensinogen	AGT	1
Annexin I	ANX 1	4
Antidiuretic hormone receptor	ADHR	2
Anti-Mullerian hormone	AMH	6
Antithrombin III	AT3	1
Apaf-1		3
Apolipoprotein E	APOE	2
Apoptosis antigen 1	APT1	4
Apoptosis antigen ligand 1	APT1LG1	4
Apoptosis-inducing factor	AIF	4
Argininosuccinate lyase	ASL	1
Aryl hydrocarbon receptor	AHR	2
Asparagine synthetase	AS	1
Aspartylglucosaminidase	AGA	1
Ataxia telangiectasia complementation group D	ATD, ATDC	6
Ataxia telangiectasia gene, AT	ATM	6

ATP-binding cassette transporter 7	ABC7	4
Attractin		4
Autoimmune regulator, AIRE	AIRE	4
B-cell CLL/lymphoma 1	BCL1	4
B-cell CLL/lymphoma 10	BCL10	4
B-cell CLL/lymphoma 3	BCL3	4
B-cell CLL/lymphoma 4	BCL4	4
B-cell CLL/lymphoma 5	BCL5	4
B-cell CLL/lymphoma 6	BCL6	4
B-cell CLL/lymphoma 7	BCL7	4
B-cell CLL/lymphoma 8	BCL8	4
B-cell CLL/lymphoma 9	BCL9	4
BCL2-associated X protein	BAX	6
BCL2-related protein A1	BCL2A1	6
Beckwith-Wiedemann region 1A	BWR1A	6
beta 2 Microglobulin	B2M	4
Bleomycin hydrolase	BLMH	1
Bloom syndrome protein	BLM	6
Bradykinin receptor B1		
Bradykinin receptor B2		
Brain derived neurotrophic factor	BDNF	6
Brain derived neurotrophic factor (BDNF) receptor	BDNFR	6
BRCA1 -associated RING domain gene 1	BARD1	6
Breakpoint cluster region	BCR	6
Breast cancer I	BRCAL	6
Breast cancer 2	BRCA2	6
Breast cancer, ductal, 1	BRCD1	6
Breast cancer, ductal, 2	BRCD2	6
Butyrylcholinesterase	BCHE	1
C3 convertase		1
Cadherin E	CDH1	6
Cadherin EP		6
Cadherin N	CDH2	6
Cadherin P	CDH3	6
Calbindin 1	CALB1	6
Calbindin D9K	CALB3	6
Calcineurin A1	CALNA1	4
Calcineurin A2	CALNA2	4
Calcineurin A3	CALNA3	4
Calcineurin B		4
Calcitonin receptor /Calcitonin gene-related peptide receptor	CALCR	5
Calcitonin/Calcitonin gene-related peptide alpha	CALCA	5
Calcium channel, voltage-dependent, Alpha 1F subunit	CACNA1F	5

Calcium channel, voltage-dependent, Alpha-1B (CACNL1A5)	CACNA1B	5
Calcium channel, voltage-dependent, Alpha-1C	CACNA1C	5
Calcium channel, voltage-dependent, Alpha-1D	CACNA1D	5
Calcium channel, voltage-dependent, Alpha-1E (CACNL1A6)	CACNA1E	5
Calcium channel, voltage-dependent, Alpha-2/delta	CACNA2	5
Calcium channel, voltage-dependent, Beta 1	CACNB1	5
Calcium channel, voltage-dependent, Beta 3	CACNB3	5
Calcium channel, voltage-dependent, L type, alpha 1S subunit	CACNA1S	5
Calcium channel, voltage-dependent, Neuronal, Gamma	CACNG2	5
Calcium channel, voltage-dependent, P/Q type, alpha 1A subunit	CACNA1A	5
Calcium channel, voltage-dependent, T-type		5
Calmodulin 1	CALM1	6
Calmodulin 2	CALM2	6
Calmodulin 3	CALM3	6
Calmodulin-dependant protein kinase II	CAMK2A	6
Calnexin	CANX	6
Calpain	CAPN,CAPN3	1
Calretinin	CALB2	5
Canalicular multispecific organic anion transporter	CMOAT	2
Carbonic anhydrase 3	CA3	1
Carbonic anhydrase 4	CA4	1
Carbonic anhydrase, alpha	CAI	1
Carbonic anhydrase, beta	CA2	1
Carboxylesterase 1	CES1	1
Cardiac-specific homeobox, CSX	CSX	6
Cartilage-hair hypoplasia gene	CHH	5
Caspase 1	CASP1	6
Catalase	CAT	4
Cathepsin G	CTSG	1
CD1	CD1	4
CD10	CD10	4
CD100	CD100	4
CD112	CD112	4
CD113	CD113	4
CD114	CD114	4
CD115	CD115	4
CD116	CD116	4
CD117	CD117	4

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CD37	4
CD38	4
CD39	4
CD4	4
CD40	4
CD41	4
CD42	4
CD43	4
CD44	4
CD45	4
CD46	4
CD47	4
CD48	4
CD5	4
CD50	4
CD52	4
CD53	4
CD55	4
CD57	4
CD58	4
CD59	4
CD6	4
CD60	4
CD63	4



CD65	CD65	4
CD66	CD66	4
CD67	CD67	4
CD68	CD68	4
CD69	CD69	4
CD7	CD7	4
CD70	CD70	4
CD71	CD71	4
CD72	CD72	4
CD73	CD73	4
CD74	CD74	4
CD75	CD75	4
CD76	CD76	4
CD77	CD77	4
CD78	CD78	4
CD79	CD79	4
CD8	CD8	4
CD80	CD80	4
CD81	CD81	4
CD83	CD83	4
CD84	CD84	4
CD85	CD85	4
CD86	CD86	4
CD88	CD88	4
CD89	CD89	4
CD9	CD9	4
CD90	CD90	4
CD91	CD91	4
CD92	CD92	4
CD93	CD93	4
CD94	CD94	4
CD96	CD96	4
CD97	CD97	4
CD98	CD98	4
CD99	CD99	4
Cell adhesion molecule, intercellular, ICAM	ICAM1	6
Cell adhesion molecule, leukocyte-endothelial, LECAM (CD62)	LECAM1	6
Cell adhesion molecule, liver, ICAM	LCAM	6
Cell adhesion molecule, neural, NCAM1	NCAM1	6
Cell adhesion molecule, neural, NCAM2	NCAM2	6
Cell adhesion molecule, platelet-endothelial, PECAM	PECAM1	6
Cell adhesion molecule, vascular, VCAM	VCAM1	6
Chediak-Higashi syndrome 1 gene	CHS1	2
Chemokine MCAF	MCAF	4
Chemokine receptor CCR2	CCR2	4

Chemokine receptor CCR3	CCR3	4
Chemokine receptor CCR5	CCR5	4
Chemokine receptor CXCR1	CXCR1	4
Chemokine receptor CXCR2	CXCR2	4
Chemokine receptor CXCR4	CXCR4	4
Cholesterylester hydrolase		4
Chondritin Sulphate A - placental receptor		4
Chromogranin A	CHGA	6
Chymase	CHY1	
Clathrin		2
CoA transferase		1
Collagen I alpha 1	COL1A1	3
Collagen I alpha 2	COL1A2	3
Collagen II alpha 1	COL2A1	3
Collagen III alpha 1	COL3A1	3
Collagen IV alpha 1	COL4A1	3
Collagen IV alpha 2	COL4A2	3
Collagen IV alpha 3	COL4A3	3
Collagen IV alpha 4	COL4A4	3
Collagen IV alpha 5	COL4A5	3
Collagen IV alpha 6	COL4A6	3
Collagen IX alpha 2	COL9A2, EDM2	3
Collagen IX alpha 3	COL9A3	3
Collagen receptor	COLR	3
Collagen V alpha 1	COL5A1	3
Collagen V alpha 2	COL5A2	3
Collagen VI alpha 1	COL6A1	3
Collagen VI alpha 2	COL6A2	3
Collagen VI alpha 3	COL6A3	3
Collagen VII alpha 1	COL7A1	3
Collagen X alpha 1	COL10A1	3
Collagen XI alpha 1	COL11A1	3
Collagen XI alpha 2	COL11A2	3
Collagen XVII alpha 1	COLL 7A1	3
Coliagenic-like tail subunit of asymmetric acetylcholinesterase	COLQ	1
Colony-stimulating factor I	CSF1	6
Colony-stimulating factor 1 receptor	CSF1R	6
Colony-stimulating factor 2	CSF2	6
Colony-stimulating factor 2 alpha receptor	CSF2RA	6
Colony-stimulating factor 2 beta receptor	CSF2RB	6
Colony-stimulating factor 3	CSF3	6
Colony-stimulating factor 3 receptor	CSF3R	6
Complement component C1 inhibitor	C1 NH	4
Complement component Clqa	CIQA	4
Complement component Clqb	CLQB	4
Complement component Clqg	CIQG	4

Complement component C1r	C1R	4
Complement component C1s	C1S	4
Complement component C2	C2	4
Complement component C3	C3	4
Complement component C4A	C4A	4
Complement component C4B	C4B	4
Complement component C5	C5	4
Complement component C6	C6	4
Complement component C7	C7	4
Complement component C8	C8B	4
Complement component C9	C9	4
Complement component receptor 1	CR1	4
Complement component receptor 2	CR2	4
Complement component receptor 3	CR3	4
Contactin	CNTN1	6
Core-binding factor, alpha 1	CBFA1	6
Core-binding factor, alpha 2	CBFA2	6
Core-binding factor, beta	CBFB	6
Cortico-steroid binding protein		2
Corticosteroid nuclear receptor		4
Corticotrophin-releasing hormone	CRH	2
Corticotrophin-releasing hormone receptor	CRHR1	2
Cortisol receptor		
C-reactive protein CRP		
c-src tyrosine kinase	CSK	6
Cyclic AMP response element binding protein	CREB	6
Cyclic AMP-dependent protein kinase	PKA	1
Cyclic nucleotide phosphodiesterase 1B	PDE1B	1
Cyclic nucleotide phosphodiesterase 1B1	PDE1B1	1
Cyclic nucleotide phosphodiesterase 2A3	PDE2A3	1
Cyclic nucleotide phosphodiesterase 3A	PDE3A	1
Cyclic nucleotide phosphodiesterase 3B	PDE3B	1
Cyclic nucleotide phosphodiesterase 4A	PDE4A	1
Cyclic nucleotide phosphodiesterase 4C	PDE4C	1
Cyclic nucleotide phosphodiesterase 5A	PDE5A	1
Cyclic nucleotide phosphodiesterase 6A	PDE6A	1
Cyclic nucleotide phosphodiesterase 6B	PDE6B	1
Cyclic nucleotide phosphodiesterase 7	PDE7	1
Cyclic nucleotide phosphodiesterase 8	PDE8	1
Cyclic nucleotide phosphodiesterase 9A	PDE9A	1
Cyclin D	CCND1	6
Cyclin-dependent kinase 1	CDK1	6
Cyclin-dependent kinase 10	CDK10	6
Cyclin-dependent kinase 2	CDK2	6
Cyclin-dependent kinase 3	CDK3	6
Cyclin-dependent kinase 4	CDK4	6
Cyclin-dependent kinase 5	CDK5	6

Cyclin-dependent kinase 6	CDK6	6
Cyclin-dependent kinase 7	CDK7	6
Cyclin-dependent kinase 8	CDK8	6
Cyclin-dependent kinase 9	CDK9	6
Cyclin-dependent kinase inhibitor 1A (P21, CIP1)	CDKN1A	6
Cyclin-dependent kinase inhibitor 1 B (P27, KIP1)	CDKN 1B	6
Cyclin-dependent kinase inhibitor 1 C (P57, KIP2)	CDKN1C	6
Cyclin-dependent kinase inhibitor 2A (p1 6)	CDKN2A	6
Cyclin-dependent kinase inhibitor 3	CDKN3	6
Cyclooxygenase 1	COX1	1
Cyclooxygenase 2	COX2	1
Cyclophilin		4
CYP11A1	CYP11A1	1
CYP11B1	CYP11B1	1
CYP11B2	CYP11B2	1
CYP17	CYP17	1
CYP19	CYP19	1
CYP1A1	CYP1A1	1
CYP1A2	CYP1A2	1
CYP1B1	CYP1B1	1
CYP21	CYP21	1
CYP24	CYP24	1
CYP27	CYP27	1
CYP27B1	PDDR	1
CYP2A1	CYP2A1	1
CYP2A13	CYP2A13	1
CYP2A3	CYP2A3	1
CYP2A6V2	CYP2A6V2	1
CYP2A7	CYP2A7	1
CYP2B6	CYP2B6	1
CYP2C18	CYP2C18	1
CYP2C19	CYP2C19	1
CYP2C8	CYP2C8	1
CYP2C9	CYP2C9	1
CYP2D6	CYP2D6	1
CYP2E1	CYP2E1	1
CYP2F1	CYP2F1	1
CYP2J2	CYP2J2	1
CYP3A3	CYP3A3	1
CYP3A4	CYP3A4	1
CYP3A5	CYP3A5	1
CYP3A7	CYP3A7	1
CYP4A11	CYP4A11	1
CYP4B1	CYP4B1	1

CYP4F2	CYP4F2	1
CYP4F3	CYP4F3	1
CYP51	CYP51	1
CYP5A1	CYP5A1	1
CYP7A	CYP7A	1
CYP8	CYP8	1
Cystathionase	CTH	1
Cystathione beta synthase	CBS	1
Cystic fibrosis transmembrane conductance regulator, CFTR	CFTR	5
Cytidine deaminase	CDA	1
Cytidine-5-prime-triphosphate synthetase	CTPS	1
Cytochrome a		1
Cytochrome c		1
Cytochrome c oxidase, MTCO		1
Cytokine-suppressive antiinflammatory drug- binding protein 1	CSBP1	
Cytokine-suppressive antiinflammatory drug- binding protein 2	CSBP2	4
Defender against cell death 1	DAD1	6
Deleted in colorectal carcinoma	DCC	6
Deoxycorticosterone (DOC) receptor		1
Deoxycytidine kinase DCK		1
Dihydrolipoyl dehydrogenase 2	PDHA	1
Dihydrolipoyl transacetylase	PDHA	1
Dopamine receptors D1	DRD1	5
Dopamine receptors D2	DRD2	5
Dopamine receptors D3	DRD3	5
Dopamine receptors D4	DRD4	5
Dopamine receptors D5	DRD5	5
Duffy blood group	FY	2
Dynamin	DNM1	6
EB1		6
Elastase 1	ELAS1	1
Elastase 2	ELAS2	1
Endoglin	ENG	3
Endo-P-D-glucuronidase		4
Enolase	ENO1	1
Erythroid kruppel-like factor	EKLF	6
Erythropoietin	EPO	4
Erythropoietin receptor	EPOR	4
Estrogen receptor	ESR	6
EWS RNA-binding protein	EWSR1	6
Factor 1 (No. one)	F1	4
Factor B, properdin		4
Factor D		4
Factor H	HF1	4

Factor I (letter I)	IF	4
Factor III	F3	4
Factor IX	F9	4
Factor V	F5	4
Factor VII	F7	4
Factor VIII	F8	4
Factor X	F10	4
Factor XI	F11	4
Factor XII	F12	4
Factor XIII A & B	F13A & F13B	4
Fanconi anemia, complementation group C	FANCC	2
Fanconi anemia, complementation group D	FANCD	2
Fc fragment of IgG, low affinity IIa, receptor for (CD32)	FCGR2A	6
Fc receptor		4
Fibrinogen alpha	FGA	3
Fibrinogen beta	FGB	3
Fibrinogen gamma	FGG	3
Fibronectin precursor	FN1	6
Follicle stimulating hormone receptor	FSHR,ODG1	6
Follicle stimulating hormone, FSH	FSHB	6
Follicular lymphoma variant translocation 1	FVT1	4
Forkhead rhabdomyosarcoma gene	FKHR	6
Forkhead transcription factor 7	FKHL7	6
Galactosyltransferase 1	GT1	6
Galactosyltransferase, alpha 1,3	GGTA1	6
Galactosyltransferase, beta 3	B3GALT	6
Glial-cell derived neurotrophic factor (GDNF) receptor		5
Glial-cell derived neurotrophic factor, GDNF	GDNF	5
Glucosaminyl (N-acetyl) transferase 2, I-branching enzyme	GCNT2	1
Glutamate receptor 1	GLUR1	5
Glutamate receptor 2	GLUR2	5
Glutamate receptor 3	GLUR3	5
Glutamate receptor 4	GLUR4	5
Glutamate receptor 5	GLUR5	5
Glutamate receptor 6	GLUR6	5
Glutamate receptor 7	GLUR7	5
Glutamate receptor, ionotropic, NMDA 1	NMDAR1	5
Glutamate receptor, ionotropic, NMDA 2A	NMDAR2A	5
Glutamate receptor, ionotropic, NMDA 2B	NMDAR2B	5
Glutamate receptor, ionotropic, NMDA 2C	NMDAR2C	5
Glutamate receptor, ionotropic, NMDA 2D	NMDAR2D	5
Glutamine synthase		1
Glutathione	GSH	2
Glutathione peroxidase, GPX1	GPX1	1

Glutathione peroxidase, GPX2	GPX2	1
Glutathione S-transferase mu 1, GSTM1	GSTM1	1
Glutathione S-transferase mu 4, GSTM4		1
Glutathione S-transferase, GSTZ1	GSTZ1	1
Glyceraldehyde-3-phosphate dehydrogenase, GAPDH	GAPDH	1
Glycerol kinase	GK	1
Glycinamide ribonucleotide (GAR) transformylase	GART	1
Glycophorin A	GYPA	3
Glycophorin B	GYPB	3
Glycophorin C	GYPC	3
Glycosyltransferases, ABO blood group	ABO	1
Glypican 3	GPC3, SDYS	6
Gonadotropin releasing hormone receptor	GNRHR	6
Growth-regulated protein precursor, GRO	GRO	4
Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 1, GNAI1	GNAI1	5
Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 2, GNAI2	GNAI2	5
Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 3, GNAI3	GNAI3	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS1	GNAS1	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS2	GNAS2	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS3	GNAS3	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS4	GNAS4	5
Guanine nucleotide-binding protein, q polypeptide	GNAQ	5
H(+), K(+) - ATPase	ATP4B	5
Haemoglobin alpha 1	HBA1	2
Haemoglobin alpha 2	HBA2	2
Haemoglobin beta	HBB	2
Haemoglobin delta	HBD	2
Haemoglobin gamma A	HBG1	2
Haemoglobin gamma B	HBG2	2
Haemoglobin gamma G	HBGG	2
Haptoglobin, alpha 1	HPA1	4
Haptoglobin, alpha 2	HPA2	4
Haptoglobin, beta	HPB	4
Hemochromatosis	HFE	2
Heparin binding epidermal growth factor	HBEGF	6
Heparin Cofactor 11	HCF2	4
Hepatitis B virus integration site 1	HVBS1	4

Hepatitis B virus integration site 2	HVBS6	4
High mobility group protein C	HMGIC	6
High mobility group protein Y	HMG1Y	6
Histamine receptors, H1		5
Histamine receptors, H2		5
Histamine receptors, H3		5
Histatin 1		4
Histatin 2		4
Histatin 3	HTN3	4
HLA-B associated transcript 1	BAT1	4
Holocarboxylase synthetase	HLCS	1
Homeobox II	HOX11	6
Homeobox HB24	HLX1	6
IC7 A and B		4
Ikars gene	IKAROS	6
Immunoglobulin alpha (IgA)	IGHA	4
Immunoglobulin delta (IgD)	IGHD	4
Immunoglobulin E (IgE) responsiveness gene	IGER	4
Immunoglobulin E (IgE) serum concentration	IGES	4
regulator gene		
Immunoglobulin epsilon (IgE)	IGHE	4
Immunoglobulin gamma (IgG) 2	IGHG2	4
Immunoglobulin heavy mu chain	IGHM	4
Immunoglobulin J polypeptide	IGJ	4
Immunoglobulin kappa constant region	IGKC	4
Immunoglobulin kappa variable region	IGKV	4
Insulin-like growth factor 1	IGF1	6
Insulin-like growth factor 1 receptor	IGF1R	6
Insulin-like growth factor 2	IGF2	6
Insulin-like growth factor 2 receptor	IGF2R	6
Integrin beta 1	ITGB1	6
Integrin beta 2	ITGB2	6
Integrin beta 3	ITGB3	6
Integrin beta 4	ITGB4	6
Integrin beta 5	ITGB5	6
Integrin beta 6	ITGB6	6
Integrin beta 7	ITGB7	6
Integrin, alpha 1	ITGAI	6
Integrin, alpha 2	ITGA2	6
Integrin, alpha 4	ITGA4	6
Integrin, alpha 5	ITGA5	6
Integrin, alpha 6	ITGA6	6
Integrin, alpha M	ITGAM	6
Intercellular adhesion molecule 1	ICAM1	4
Intercellular adhesion molecule 2	ICAM2	4
Intercellular adhesion molecule 3	ICAM3	4
Interferon alpha	IFNA1	4



Interferon beta	IFNB	4
Interferon gamma	IFNG	4
Interferon gamma receptor 1	IFNGR1	4
Interferon gamma receptor 2	IFNGR2	4
Interferon regulatory factor 1	IRF1	4
Interferon regulatory factor 4	IRF4	4
Interleukin(IL) 1 receptor	IL1R	4
Interleukin(IL) 1, alpha	IL1A	4
Interleukin(IL) 1, beta	IL1B	4
Interleukin(IL) 10	IL10	4
Interleukin(IL) 10 receptor	IL10R	4
Interleukin(IL) 11	IL11	4
Interleukin(IL) 11 receptor	IL11R	4
Interleukin(IL) 12	IL12	4
Interleukin(IL) 12 receptor, beta 1	IL12RB1	4
Interleukin(IL) 13	IL13	4
Interleukin(IL) 13 receptor	IL13R	4
Interleukin(IL) 2	IL2	4
Interleukin(IL) 2 receptor, alpha	IL2RA	4
Interleukin(IL) 2 receptor, gamma	IL2RG	4
Interleukin(IL) 3	IL3	4
Interleukin(IL) 3 receptor	IL3R	4
Interleukin(IL) 4	IL4	4
Interleukin(IL) 4 receptor	IL4R	4
Interleukin(IL) 5	IL5	4
Interleukin(IL) 5 receptor	IL5R	4
Interleukin(IL) 6	IL6	4
Interleukin(IL) 6 receptor	IL6R	4
Interleukin(IL) 7	IL7	4
Interleukin(IL) 7 receptor	IL7R	4
Interleukin(IL) 8	IL8	4
Interleukin(IL) 8 receptor	IL8R	4
Interleukin(IL) 9	IL9	4
Interleukin(IL) 9 receptor	IL9R	4
Interleukin(IL) receptor antagonist 1	IL1RN, IL1RA	4
Janus kinase 1	JAK1	6
Janus kinase 2	JAK2	6
Janus kinase 3	JAK3	6
Kallikrein 3	KAK3	4
Kell blood group precursor	XK, KEL	2
Kininogen, High molecular weight	KNG	4
Kynureninase		1
Lactotransferrin	LTF	2
Laminin 5, alpha 3	LAMA3	6
Laminin 5, beta 3	LAMB3	6
Laminin 5, gamma 2	LAMC2	6
Laminin M	LAMM	6

Laminin receptor 1	LAMR1	6
Latent transforming growth factor-beta binding protein 2	LTBP2	6
Lectin, mannose-binding 1	LMAN1	4
Lectin, mannose-binding 2	MBL2	4
Leptin	LEP	6
Leptin receptor	LEPR	6
Leukaemia inhibitory factor	LIF	6
Leukaemia inhibitory factor receptor	LIFR	6
Leukin		4
Leukocyte-specific transcript I	LST-1	4
Leukotriene A4 hydrolase		4
Leukotriene A4 synthase	LTA4S	1
Leukotriene B4 receptor		4
Leukotriene B4 synthase	LTB4S	1
Leukotriene C4 receptor		4
Leukotriene C4 synthase	LTC4S	1
Leukotriene D4/E4 receptor		4
LIM homeobox protein 1	LHX1	6
LIM homeobox protein 2	LHX2	6
LIM homeobox protein 3	LHX3	6
LIM homeobox protein 4	LHX4	6
LIM-domain only protein 1	LM01	6
LIM-domain only protein 2	LM02	6
LIM-domain only protein 3	LM03	6
LIM-domain only protein 4	LM04	6
LIM-Kinase I (LINK-1)		4
Lipocortin 1	ANX4	4
Lipoprotein-associated coagulation factor	LACI	4
Lipoxygenase 12 (platelets)	LOG12	4
Lipoxygenase 5 (leukocytes)		4
Lymphoblastic leukemia derived sequence 1	LYLL	4
Lymphocyte-specific protein tyrosine kinase	LCK	4
Lymphoid enhancer-binding factor	LEF-1	6
lymphotoxin		4
Lysozyme	LYZ	4
Macrophage activating factor	MAF	4
Macrophage inflammatory protein-1	MIP1	4
Macrophage inflammatory protein-1	receptor	4
Macrophage inflammatory protein-2	MIP2	4
Macrophage inflammatory protein-2 receptor		
MAD (mothers against decapentaplegic, Drosophila) homologue 3	MADH3	6
MAD (mothers against decapentaplegic, Drosophila) homologue 4	MADH4	6
Malignant proliferation, eosinophil gene	MPE	4
Mannose binding protein	MBP	4

Mannosidase, alpha B lysosomal	MANB	1
Marenostrin	MEFV	2
Matrix metalloproteinase 1	MMP1	1
Matrix metalloproteinase 10	NMP10	1
Matrix metalloproteinase 11	MMP11	1
Matrix metalloproteinase 12	MMP12	1
Matrix metalloproteinase 13	MMP13	1
Matrix metalloproteinase 14	MMP14	1
Matrix metalloproteinase 15	MMP15	1
Matrix metalloproteinase 16	MMP16	1
Matrix metalloproteinase 17	MMP17	1
Matrix metalloproteinase 18	MMP18	1
Matrix metalloproteinase 19	MMP19	1
Matrix metalloproteinase 2	MMP2	1
Matrix metalloproteinase 3	MMP3, STMY1	1
Matrix metalloproteinase 4	MMP4	1
Matrix metalloproteinase 5	MMP5	1
Matrix metalloproteinase 6	MMP6	1
Matrix metalloproteinase 7	MMP7	1
Matrix metalloproteinase 8	MMP8	1
Matrix metalloproteinase 9	MMP9	1
MHC Class I: A		4
MHC Class I: B		4
MHC Class I: C		4
MHC Class I: LMP-2, LMP-7		4
MHC Class I: Tap1	ABCR, TAP1	4
MHC Class II: DP	HLA-DPB1	4
MHC Class II: DQ		4
MHC Class II: DR		4
MHC Class II: Tap2	TAP2, PSF2	4
MHC Class II: Complementation group A	MHC2TA	4
MHC Class II: Complementation group B	RFXANK	4
MHC Class II: Complementation group C	RFX5	4
MHC Class II: Complementation group D	RFXAP	4
Monocyte chemoattractant protein 1	MCP1	
Mucin 18	MUC18	2
Mutated in colorectal cancers, MCC	MCC	6
MutL homolog 1	MLH1	6
MutS homolog 2	MSH2	6
MutS homolog 3	MSH3	6
Myeloid leukemia factor-1	MLF1	
Myeloperoxidase	MPO	
Myoglobin		2
Myosin 5A	MYO5A	3
N-acyl hydrolase		4
NADPH oxidase reductase		4

Natural resistance-associated macrophage protein 1	NRAMP1	4
NB6		4
Nerve growth factor	NGF	6
Nerve growth factor receptor	NGFR	6
Neurofibromin 1	NF1	6
Neurofibromin 2	NF2	6
Neurokinin A	NKNA	5
Neurokinin B	NKNB	5
Neuropeptide Y	NPY	5
Neuropeptide Y receptor Y1	NPY1R	5
Neuropeptide Y receptor Y2	NPY2R	5
Neutral endopeptidase		1
Neutrophil cystolic factor 1	NCF1	4
Neutrophil cystolic factor 2	NCF2	4
Nitric oxide synthase 1, NOS1	NOS1	1
Nitric oxide synthase 2, NOS2	NOS2	1
Nitric oxide synthase 3, NOS3	NOS3	1
Norrie disease protein	NDP	6
Notch 3	NOTCH3	6
Notch ligand -jagged 1	JAG 1, AGS	6
Nuclear factor 1-kappa-B-like gene	IKBL	4
Nuclear factor kappa beta	NFKB	4
Nuclear factor of activated T cells (NFAT) complex, cytosolic	NFATC	6
Nuclear factor of activated T cells (NFAT) complex, preexisting component	NFATP	6
Nucleoside diphosphate kinase-A	NDPKA	1
Oncogene bcl2		6
Oncogene ELK1	ELK1	6
Oncogene ELK2	ELK2	6
Oncogene ERG (early reponse gene)		6
Oncogene GLI1	GLI1	6
Oncogene GLI2	GLI2	6
Oncogene GLI3	GLI3	6
Oncogene spi1		6
Oncogene TEL	ETV6	6
Oncostatin M	OSM	6
Oncostatin M receptor	OSMR	6
Ornithine delta-aminotransferase	OAT	1
Osteonectin	ON	6
Osteopontin	OPN	6
Paired box homeotic gene 3	PAX3	6
Paired box homeotic gene 7	PAX7	6
Patched (Drosophila) homolog, PTCH	PTCH	6
Peanut-like 1	PNUTL1	4
Phagocytin		4

Phenylethanolamine N-methyltransferase, PNMT	PNMT	1
Phosphatidylinositol glycan, class A (paroxysmal nocturnal hemoglobinuria)	PIGA	6
Phospholipase A2, group 10	PLA2G10	4
Phospholipase A2, group 1B	PLA2G1B	4
Phospholipase A2, group 2A	PLA2G2A	4
Phospholipase A2, group 2B	PLA2G2B	4
Phospholipase A2, group 4A	PLA2G4A	4
Phospholipase A2, group 4C	PLA2G4C	4
Phospholipase A2, group 5	PLA2G5	4
Phospholipase A2, group 6	PLA2G6	4
Phospholipase C alpha		4
Phospholipase C beta		4
Phospholipase C delta	PLCD1	4
Phospholipase C epsilon		4
Phospholipase C gamma	PLCG1	4
Phosphomannomutase-2	PMM2	2
Plakophilin 1	PKP1	2
Plasminogen	PLG	1
Plasminogen activator inhibitor 1	PAI 1	1
Plasminogen activator inhibitor 2	PAI2	1
Plasminogen activator receptor, Urokinase	UPAR;PLAUR	3
Plasminogen activator, Tissue	PLAT,TPA	1
Plasminogen activator, Urokinase	UPA;PLAU	1
Platelet glycoprotein Ib, alpha	GPIBA	4
Platelet glycoprotein Ib, beta	GPLBB	4
Platelet glycoprotein Ib, gamma	GPLBG	4
Platelet glycoprotein IX	GP9	4
Platelet glycoprotein V	GP5	4
Platelet-activating factor acetylhydrolase 1 B	PAFAH1B1 or LIS1	4
Platelet-activating factor acetylhydrolase 2	PAFAH2	4
Platelet-activating factor receptor	PAFR	4
Poliovirus receptor	PVR,PVS	4
Potassium channel, calcium-activated,	KCNN4	5
Potassium inwardly-rectifying channel J1	KCNJ1	5
Potassium inwardly-rectifying channel J11	KCNJ11	5
Potassium voltage-gated channel A1	KCNA1	5
Potassium voltage-gated channel E1	KCNE1	5
Potassium voltage-gated channel Q1	KCNQ1	5
Potassium voltage-gated channel Q2	KCNQ2	5
Potassium voltage-gated channel Q3	KCNQ3	5
Prekallikrein		4
Preproenkephalin	PENK	5
Procollagen N-protease		1
Promyelocytic leukemia gene	PML	6
Proopiomelanocortin	POMC	5

Properdin P factor, complement	PFC, PFD	4
Prostacyclin synthase		4
Prostaglandin (PG) D synthase, hematopoietic	PGDS	1
Prostaglandin 15-OH dehydrogenase	HGPD;PGDH	4
Prostaglandin D - DP receptor		4
Prostaglandin E1 receptor		4
Prostaglandin E2 receptor		4
Prostaglandin E3 receptor		4
Prostaglandin F - FP receptor		4
Prostaglandin I2 receptor		2
Prostaglandin IP receptor		4
Prostaglandin isomerase		6
Prostaglandin-endoperoxidase synthase 2	PTGS2	6
Protease inhibitor 1		2
Protein C	PROC	4
Protein C inhibitor	PCI	4
Protein kinase A		1
Protein kinase C, alpha	PRKCA	1
Protein kinase C, gamma	PRKCG	1
Protein kinase DNA-activated	PRKDC	1
Protein kinase G		1
Protein phosphatase 1, regulatory (inhibitor) subunit 3	PPPIR3	1
Protein phosphatase 2, regulatory subunit A, beta isoform	PPP2R1B	1
Protein S	PROS1	4
Protein tyrosine phosphatase, non-receptor type 12	PTPN12	6
Proteinase 3		
Prothrombin precursor	F2	4
Purine nucleoside phosphorylase	NP	1
Pyruvate decarboxylase	PDHA	1
Retinoblastoma 1	RB1	6
Retinol binding protein 4	RBP4	2
Rhesus blood group, CcEe antigens	RHCE	2
Rhesus blood group, D antigen	RHD	2
Rhesus blood group-associated glycoprotein	RHAG	2
Ribosomal protein S 19	RPS19	1
RIGUI	RIGUI	6
S100 calcium-binding protein A2	S100A2	5
S100 calcium-binding protein A3	S100A3	5
S100 calcium-binding protein A5	S100A5	5
S100 calcium-binding protein A6	S100A6	5
S100 calcium-binding protein A7	S100A7	5
S100 calcium-binding protein A8	S100A8	5
S100 calcium-binding protein P	S100P	5
SAP (SLAM associated protein)	SH2D1A	4

Selectin E	SELE	5
Selectin L	SELL	5
Selectin P	SELP	5
Serotonin receptor, 5HT1A	HTR1A	5
Serotonin receptor, 5HT1B	HTR1B	5
Serotonin receptor, 5HT1C	HTR1C	5
Serotonin receptor, 5HT1D	HTR1D	5
Serotonin receptor, 5HT1E	HTR1E	5
Serotonin receptor, 5HT1F	HTR1F	5
Serotonin receptor, 5HT2A	HTR2A	5
Serotonin receptor, 5HT2B	HTR2B	5
Serotonin receptor, 5HT2C	HTR2C	5
Serotonin receptor, 5HT3	HTR3	5
Serotonin receptor, 5HT4	HTR4	5
Serotonin receptor, 5HT5	HTR5	5
Serotonin receptor, 5HT6	HTR6	5
Serotonin receptor, 5HT7	HTR7	5
Severe combined immunodeficiency, type A (Athabaskan)	SCIDA	4
Signal transducer and activator of transcription STAT1 1		6
Signal transducer and activator of transcription STAT2 2		6
Signal transducer and activator of transcription STAT3 3		6
Signal transducer and activator of transcription STAT4 4		6
Signal transducer and activator of transcription STAT5 5		6
Signaling lymphocyte activation molecule	SLAM	4
Sine oculis homeobox, drosophila, homolog 1	SIX1	6
Sine oculis homeobox, drosophila, homolog 2	SIX2	6
Sjogren (Sjogren) syndrome antigen A1	SSA1	4
Sodium channel, non-voltage gated 1, alpha	SCNN1A	5
Sodium channel, non-voltage gated 1, beta	SCNN1B	5
Sodium channel, non-voltage gated 1, gamma	SCNN1G	5
Sodium channel, voltage gated, type V, alpha polypeptide	SCN5A	5
Sodium channel, voltage-gated, type 1, beta polypeptide	SCN1B	5
Solute carrier family 19 (folate transporter), member 1	SLC19A1	2
Solute carrier family 20, member 1	SLC20A1	2
Solute carrier family 20, member 2	SLC20A2	2
Solute carrier family 5 (sodium/glucose transporter), member 1	SLC5A1	2

Solute carrier family 5 (sodium/glucose transporter), member 2	SLC5A2	2
Solute carrier family 5 (sodium/glucose transporter), member 5	SLC5A5	2
Solute carrier family 5, member 3	SLC5A3	2
Sorcin	SRI	2
Sperm prolamine P1	PRM1	6
Sperm prolamine P2	PRM2	6
Stem cell factor	SCF	6
Stromal derived factor 1	SDF1	6
Succinate dehydrogenase 1	SDHL	1
Succinate thiokinase		1
Superoxide dismutase 1	SOD1	1
Superoxide dismutase 3	SOD3	1
SYK-related tyrosine kinase	SRK	4
Talin	TLN	6
Talin, TLN		3
T-cell acute lymphocytic leukemia 1	TAL1	4
T-cell acute lymphocytic leukemia 2	TAL2	4
T-cell receptor, alpha	TCRA	4
T-cell receptor, delta	TCRD	4
Tenascin (cytotactin)		3
Tenascin XA	TNXA	3
Terminal deoxynucleotidyltransferase	TDT	4
Terminal deoxynucleotidyltransferase, TDT		1
Thrombin receptor	F2R	4
Thrombopoietin	THPO	6
Thrombospondin	THBSI	6
Thromboxane A synthase I	TBXAS1	4
Thromboxane A2	TXA2	4
Thromboxane A2 receptor	TBXA2R	4
Thy-1 T-cell antigen	THY1	4
Thymic humoral factor		4
Thymopoietin	TMPO	6
Thymosin		4
TIE receptor tyrosine kinase	TIE-1	6
Tip-associated protein	TAP	4
Toll-like receptor 4	TLR4	4
Topoisomerase I		1
Topoisomerase II		2
Transcobalamin 2, TCN2	TCN2	2
Transcription factor 3	TCF3	6
Transcription factor binding to IGHM enhancer 3	TFE3	6
Transferrin	TF	6
Transferrin receptor	TFRC	6
Transforming growth factor, alpha	TGFA	6



Transforming growth factor, beta 2	TGFB2	6
Transforming growth factor, beta induced	TGFB1	6
Transforming growth factor, beta receptor 2	TGFB2	6
Tuberous sclerosis 1	TSC1	6
Tuberous sclerosis 2	TSC2	6
Tubulin		3
Tumour necrosis factor (TNF) receptor associated factor 1	TRAF1	4
Tumour necrosis factor (TNF) receptor associated factor 2	TRAF2	4
Tumour necrosis factor (TNF) receptor associated factor 3	TRAF3	4
Tumour necrosis factor (TNF) receptor associated factor 4	TRAF4	4
Tumour necrosis factor (TNF) receptor associated factor 5	TRAF5	4
Tumour necrosis factor (TNF) receptor associated factor 6	TRAF6	4
Tumour necrosis factor alpha	TNFA	4
Tumour necrosis factor alpha receptor	TNFAR	4
Tumour necrosis factor beta	TNFB	4
Tumour necrosis factor beta receptor	TNFBR	4
Tumour protein p53	TP53,P53	6
Tumour protein p63	TP63	6
Tumour protein p73	TP73	6
Tumour protein, transiotionally-controlled 1	TPT1	6
Tumour suppressor gene DRA	DRA	4
Ubiquitin		6
Ubiquitin activating enzyme, E1		1
Ubiquitin B	UBB	6
Ubiquitin C	UBC	6
Ubiquitin fusion degeneration I-like	UFD1L	6
Ubiquitin protein ligase E3A	UBE3A	1
Undulin 1	COL14A1	3
Uridine monophosphate kinase	UMPK	4
Uridine monophosphate synthetase	UMPS	4
Uroporphyrinogen III synthase	UROS	1
Vimentin	VIM	4
v-myc avian myelocytomatosis viral oncogene homolog	MYC	6
Von Hippel-Lindau gene	VHL	6
Werner syndrome helicase	WRN	6
Wilms tumour gene 1	WT1	6
Wilms tumour gene 2	WT2	6
Wilms tumour gene 4	WT4	6
Winged helix nude	WHN	6
Wiskott-Aldrich syndrome protein	WASP, THC	4

Xanthine dehydrogenase	XDH	1
X-ray repair gene	XRCC9	6
Zinc finger protein HRX	ALL1	4,

## Legende für die Spalte Proteinfunktion:

1	Enzym	2	Transport und Lagerung
3	Struktur	4	Immunität
5	Nervale Transmission	6	Wachstum und Differenzierung

**Tabelle 12**

**Fehlfunktion, Schädigung oder Erkrankung des Körpers als Folge einer Abweichung im Entwicklungsprozess**

<b>Liste der Gene</b>	<b>HUGO Gensymbol</b>	<b>Protein- funktion</b>
17-Ketosteroid reductase		5
2,4-Dienoyl CoA reductase	DECR	1
3 beta Hydroxysteroid dehydrogenase 2	HSD3B2	1
3-Oxoacid CoA transferase	OXCT	1
6-Pyruvoyltetrahydropterin synthase	PTS	1
Absent in melanoma 1 gene	AIM1	6
Acetoacetyl 2-CoA-thiolase	ACAT2	1
Acetyl CoA acyltransferase	ACAA	1
Acetyl CoA carboxylase alpha	ACACA	1
Acetylcholine receptor, nicotinic, alpha A1	CHRNA1	5
Acetylcholine receptor, nicotinic, alpha A2	CHRNA2	5
Acetylcholine receptor, nicotinic, alpha A3	CHRNA3	5
Acetylcholine receptor, nicotinic, alpha A4	CHRNA4	5
Acetylcholine receptor, nicotinic, alpha A5	CHRNA5	5
Acetylcholine receptor, nicotinic, alpha A6	CHRNA6	5
Acetylcholine receptor, nicotinic, alpha A7	CHRNA7	5
Acetylcholine receptor, nicotinic, beta 1	CHRNA1	5
Acetylcholine receptor, nicotinic, beta 2	CHRNA2	5
Acetylcholine receptor, nicotinic, beta 3	CHRNA3	5
Acetylcholine receptor, nicotinic, beta 4	CHRNA4	5
Acetylcholine receptor, nicotinic, epsilon	CHRNA5	5
Acetylcholine receptor, nicotinic, gamma	CHRNA6	5
Acetylcholinesterase	ACHE	1
Achromatopsia 2	ACHM2	3
Acid phosphatase 2, lysosomal	ACP2	1
Acrosin	ACR	6
Actin, alpha, cardiac	ACTC	3
Actin, alpha, skeletal	ACTA1	3
Actin, alpha, smooth, aortic	ACTA2	3
Activin		6
Activin A receptor, type 2B	ACVR2B	6
Activin A receptor, type 2-like kinase 1	ACVRL1	6
Acyl CoA dehydrogenase, short chain	ACADS	1
Acyl-CoA thioesterase		1
ADAM (A disintegrin and metalloproteinase) 1	ADAM1	1
ADAM (A disintegrin and metalloproteinase) 10	ADAM10	1
ADAM (A disintegrin and metalloproteinase) 11	ADAM11	1
ADAM (A disintegrin and metalloproteinase) 12	ADAM12	1
ADAM (A disintegrin and metalloproteinase) 13	ADAM13	1
ADAM (A disintegrin and metal oproteinase) 14	ADAM14	1

ADAM (A disintegrin and metalloproteinase) 15	ADAM15	1
ADAM (A disintegrin and metalloproteinase) 16	ADAM16	1
ADAM (A disintegrin and metalloproteinase) 17	ADAM17	1
ADAM (A disintegrin and metalloproteinase) 18	ADAM18	1
ADAM (A disintegrin and metalloproteinase) 19	ADAM19	1
ADAM (A disintegrin and metalloproteinase) 2	ADAM2	1
ADAM (A disintegrin and metalloproteinase) 3A	ADAM3A	1
ADAM (A disintegrin and metalloproteinase) 3B	ADAM3B	1
ADAM (A disintegrin and metalloproteinase) 4	ADAM4	1
ADAM (A disintegrin and metalloproteinase) 5	ADAM5	1
ADAM (A disintegrin and metalloproteinase) 6	ADAM6	1
ADAM (A disintegrin and metalloproteinase) 7	ADAM7	1
ADAM (A disintegrin and metalloproteinase) 8	ADAM8	1
ADAM (A disintegrin and metalloproteinase) 9	ADAM9	1
Adducin, alpha	ADD1	3
Adducin, beta	ADD2	3
Adenomatous polyposis coli tumour suppressor gene	APC	6
Adenosine deaminase	ADA	1
Adenosine monophosphate deaminase	AMPD	1
Adenosine receptor A1	ADORA1	5
Adenosine receptor A2A	ADORA2A	5
Adenosine receptor A2B	ADORA2B	5
Adenosine receptor A3	ADORA3	5
Adenyl cyclase		5
Adenylate cyclase 1	ADCY1	1
Adenylate cyclase 2	ADCY2	1
Adenylate cyclase 3	ADCY3	1
Adenylate cyclase 4	ADCY4	1
Adenylate cyclase 5	ADCY5	1
Adenylate cyclase 6	ADCY6	1
Adenylate cyclase 7	ADCY7	1
Adenylate cyclase 8	ADCY8	1
Adenylate cyclase 9	ADCY9	1
Adenylosuccinate lyase	ADSL	1
ADP-ribosyltransferase	ADPRT	1
Adrenergic receptor, alpha1	ADRA1	5
Adrenergic receptor, alpha2	ADRA2	5
Adrenergic receptor, beta1	ADRB1	5
Adrenergic receptor, beta2	ADRB2	5
Adrenergic receptor, beta3	ADR83	5
Adrenocorticotrophic hormone (ACTH) receptor	ACTHR	6
Adrenoleukodystrophy gene	ALD	1
Alanine-glyoxylate aminotransferase	AGXT	1

Albumin, ALB	ALB	2
Aldehyde dehydrogenase 1	ALDH1	1
Aldehyde dehydrogenase 10	ALDH10	1
Aldehyde dehydrogenase 2	ALDH2	1
Aldehyde dehydrogenase 5	ALDH5	1
Aldehyde dehydrogenase 6	ALDH6	1
Aldehyde dehydrogenase 7	ALDH7	1
Aldolase A	ALDOA	1
Aldolase B	ALDOB	1
Aldolase C	ALDOC	1
Aldosterone receptor	MLR	6
Alkaline phosphatase, liver/bone/kidney	ALPL	2
Alkaptonuric gene	AKU	6
Alkylglycerone phosphate synthase	AGPS	1
Alpha 2 macroglobulin	A2M	4
alpha tectorin	TECTA	6
alpha thalassemia gene	ATRX	5
alpha1-Antitrypsin	PI	1
alpha2-Antiplasmin	PLI	1
alpha-Actinin 2	ACTN2	6
alpha-Actinin 3	ACTN3	6
alpha-Amylase		1
Alpha-fetoprotein	AFP	6
alpha-Galactosidase A	GLA	1
alpha-ketoglutarate dehydrogenase		1
alpha-L-Iduronidase	IDUA	1
alpha-Synuclein	SNCA	5
Amelogenin	AMELX	3
Aminomethyltransferase	AMT	1
Aminopeptidase P	XPNPEP2	1
Amphiregulin	AREG	6
Amylo-1,6-glucosidase	AGL	1
Amyloid beta (A4) precursor protein-binding, APBB1	APBB1	5
Amyloid beta A4 precursor protein	APP	5
Amyloid beta A4 precursor-like protein	APLP	5
Androgen binding protein	ABP	2
Androgen receptor	AR	6
Angiopoietin 1	ANGPT1	6
Angiopoietin 2	ANGPT2	6
Angiotensin converting enzyme	ACE,DCP1	1
Angiotensinogen	AGT	1
Ankyrin 1	ANK1	3
Ankyrin 2	ANK2	3
Ankyrin 3	ANK3	3
Antidiuretic hormone receptor	ADHR	2
Anti-Mullerian hormone	AMH	6

Anti-Mullerian hormone type 2 receptor	AMHR2	6
Antithrombin III	AT3	1
AP-2, alpha	TFAP2A	6
AP-2, beta	TFAP2B	6
AP-2, gamma	TFAP2C	6
Apaf-1		3
Apical protein, xenopus laevis-like	APXL	6
Apolipoprotein A 4	APOA4	2
Apolipoprotein A I	APOA1	2
Apolipoprotein A II	APOA2	2
Apolipoprotein B	APOB	2
Apolipoprotein C1	APOC1	2
Apolipoprotein C2	APOC2	2
Apolipoprotein C3	APOC3	2
Apolipoprotein D	APOD	2
Apolipoprotein E	APOE	2
Apolipoprotein H	APOH	2
Apopain	CPP32	6
Apoptosis antigen 1	APT1	4
Apoptosis antigen ligand 1	APT1LG1	4
Apoptosis-inducing factor	AIF	4
Apurinic endonuclease	APE	1
Archaete-scute homolog 1	ASH1	6
Archaete-scute homolog 2	ASH2	6
Arginosuccinate synthetase	ASS	1
Arrestin	SAG	3
Aryl hydrocarbon receptor	AHR	2
Aryl hydrocarbon receptor nuclear translocator	ARNT	2
Arylsulfatase A	ARSA	1
Arylsulfatase B	ARSB	1
Arylsulfatase C	ARSC1	1
Arylsulfatase D	ARSD	1
Arylsulfatase E	ARSE	1
Arylsulfatase F	ARSF	1
Aspartate transaminase		2
Aspartate transcarbamoylase		1
Aspartoacylase	ASPA	1
Aspartylglucosaminidase	AGA	1
Astrotactin	ASTN	6
Ataxia telangiectasia complementation group D	ATD, ATDC	6
Ataxia telangiectasia gene, AT	ATM	6
Ataxin 1	SCA1	6
Ataxin 2	SCA2	6
Ataxin 3	MJD	6
ATP-binding cassette transporter 7	ABC7	4
Atrial natriuretic peptide	ANP	6
Atrial natriuretic peptide receptor A	NPR1	6

Atrial natriuretic peptide receptor B	NPR2	6
Atrial natriuretic peptide receptor C	NPR3	6
Atrophin 1	DRPLA	6
Affractin		
Autoimmune regulator, AIRE	AIRE	
Azoospermia factor 1	AZF1	6
Bagpipe homeobox, drosophila homolog of, 1	BAPX1	6
B-cell CLL/lymphoma 1	BCL1	4
B-cell CLL/lymphoma 10	BCL10	4
B-cell CLL/lymphoma 3	BCL3	4
B-cell CLL/lymphoma 4	BCL4	4
B-cell CLL/lymphoma 5	BCL5	4
B-cell CLL/lymphoma 6	BCL6	4
B-cell CLL/lymphoma 7	BCL7	4
B-cell CLL/lymphoma 8	BCL8	4
B-cell CLL/lymphoma 9	BCL9	4
BCL2-associated X protein	BAX	6
BCL2-related protein A1	BCL2A1	6
Beckwith-Wiedemann region 1A	BWR1A	6
Bestrophin	VMD2	2
beta 2 Microglobulin	B2M	4
beta-Endorphin receptor		5
beta-Glucuronidase	GUSB	1
beta-N-Acetylhexosaminidase, A		1
beta-N-Acetylhexosaminidase, B		1
Bilirubin UDP-glucuronosyltransferase		1
Bleomycin hydrolase	BLMH	1
Bloom syndrome protein	BLM	6
Blue cone pigment	BCP	3
Bone morphogenetic protein, BMP1	BMP1	6
Bone morphogenetic protein, BMP2	BMP2	6
Bone morphogenetic protein, BMP3	BMP3	6
Bone morphogenetic protein, BMP4	BMP4	6
Bone morphogenetic protein, BMP5	BMP5	6
Bone morphogenetic protein, BMP6	BMP6	6
Bone morphogenetic protein, BMP7	BMP7	6
Bone morphogenetic protein, BMP8	BMP8	6
Brain derived neurotrophic factor	BDNF	6
Brain derived neurotrophic factor (BDNF) receptor	BDNFR	6
Branched chain aminotransferase 1, cytosolic	BCAT1	1
Branched chain aminotransferase 2, mitochondrial	BCAT2	1
BRCA1-associated RING domain gene 1	BARD1	6
Breakpoint cluster region	BCR	6
Breast cancer 1	BRCA1	6
Breast cancer 2	BRCA2	6

Breast cancer, ductal, 1	BRCD1	6
Breast cancer, ductal, 2	BRCD2	6
Bruton agammaglobulinaemia tyrosine kinase	BTK	6
Butyrylcholinesterase	BCHE	1
C3 convertase		1
Ca(2+) transporting ATPase, fast twitch	ATP2A1	2
Ca(2+) transporting ATPase, slow twitch	ATP2A2	2
Cadherin E	CDHI	6
Cadherin EP		6
Cadherin N	CDH2	6
Cadherin P	CDH3	6
Calbindin 1	CALB1	6
Calbindin D9K	CALB3	6
Calcium channel, voltage-dependent, Alpha 1 F subunit	CACNA1F	5
Calcium channel, voltage-dependent, Alpha-1B (CACNL1A5)	CACNA1B	5
Calcium channel, voltage-dependent, Alpha-1 C	CACNA1C	5
Calcium channel, voltage-dependent, Alpha-1 D	CACNA1D	5
Calcium channel, voltage-dependent, Alpha-1 E (CACNL1A6)	CACNA1E	5
Calcium channel, voltage-dependent, Alpha-2/delta	CACNA2	5
Calcium channel, voltage-dependent, Beta 1	CACNB1	5
Calcium channel, voltage-dependent, Beta 3	CACNB3	5
Calcium channel, voltage-dependent, L type, alpha 1S subunit	CACNA1S	5
Calcium channel, voltage-dependent, Neuronal, Gamma	CACNG2	5
Calcium channel, voltage-dependent, P/Q type, alpha 1A subunit	CACNA1A	5
Calcium channel, voltage-dependent, T-type		5
Calcium sensing receptor	CASR	2
Calmodulin 1	CALM1	6
Calmodulin 2	CALM2	6
Calmodulin 3	CALM3	6
Calmodulin dependent kinase		2
Calmodulin-dependant protein kinase II	CAMK2A	6
Calnexin	CANX	6
Calpain	CAPN,CAPN3	1
Canalicular multispecific organic anion transporter	CMOAT	2
Carbamoylphosphate synthetase 1	CPS1	1
Carbamoylphosphate synthetase 2	CPS2	1
Carbonic anhydrase 3	CA3	1



Carbonic anhydrase 4	CA4	1
Carbonic anhydrase, alpha	CA1	1
Carbonic anhydrase, beta	CA2	1
Cardiac-specific homeobox, CSX	CSX	6
Carnitine acetyltransferase	CRAT	1
Carnitine acylcarnitine translocase	CACT	1
Carnitine transporter protein	CDSP,SCD	2
Cartilage oligomeric matrix protein	COMP, EDM1,	5
PSACH		
Cartilage-hair hypoplasia gene	CHH	5
Caspase 1	CASP1	6
Caspase 10	CASP10	6
Caspase 2	CASP2	6
Caspase 3	CASP3	6
Caspase 4	CASP4	6
Caspase 5	CASP5	6
Caspase 6	CASP6	6
Caspase 7	CASP7	6
Caspase 8	CASP8	6
Caspase 9	CASP9	6
Catechol-o-methyltransferase	COMT	1
Catenin, alpha	CTNNA1	6
Catenin, beta	CTNNB1	6
Catenin, gamma		6
Cathepsin K	CTSK	1
Caveolin 3	CAV3	1
CD1	CD1	4
CD44	CD44	4
Cdc 25 phosphatase		6
Cdc2	CDC2	6
CDX1		6
CEA		6
Cell adhesion molecule, intercellular, ICAM	ICAM1	6
Cell adhesion molecule, leukocyte-endothelial, LECAM1		6
LECAM (CD62)		
Cell adhesion molecule, liver, LCAM	LCA	6
Cell adhesion molecule, neural, NCAM1	NCAM1	6
Cell adhesion molecule, neural, NCAM2	NCAM2	6
Cell adhesion molecule, platelet-endothelial, PECAM	PECAM	6
Cell adhesion molecule, vascular, VCAM	VCAM1	6
Cellubrevin	CEB	5
c-erbB1	ERBB1	6
c-erbB2	ERBB2	6
c-erbB3	ERBB3	6
c-erbB4	ERBB4	6
Ceroid lipofuscinosis neuronal 2	CLN2	5

Ceroid lipofuscinosis neuronal 3	CLN3	5
Ceroid lipofuscinosis neuronal 4	CLN4	5
Ceroid lipofuscinosis neuronal 5	CLN5	5
Ceroid lipofuscinosis neuronal 6	CLN6	5
Chediak-Higashi syndrome 1 gene	CHS1	2
Chemokine MCAF	MCAF	4
Chemokine receptor CCR2	CCR2	4
Chemokine receptor CCR3	CCR3	4
Chemokine receptor CCR5	CCR5	4
Chemokine receptor CXCR1	CXCR1	4
Chemokine receptor CXCR2	CXCR2	4
Chemokine receptor CXCR4	CXCR4	4
Chloride channel 5	CLCN5	3
Cholestasis, progressive familial intrahepatic 1 gene	FIC1	6
Cholesterol ester transfer protein	CETP	2
Choline acetyltransferase	CHAT	1
Choroideremia gene	CHM	3
Chromogranin A	CHGA	6
Ciliary neurotrophic factor (CNTF)	CNTF	6
Ciliary neurotrophic factor (CNTF) receptor	CNTFR	6
c-kit receptor tyrosine kinase		6
Clathrin		2
Cleavage signal-1 protein	CS1	6
Cleft palate gene	CPX	6
Clusterin	CLU	6
CoA transferase		1
Cochlin	COCH	4
Cockayne syndrome gene, CKN1	CKN1	6
Collagen I alpha 1	COL1A1	3
Collagen I alpha 2	COL1A2	8
Collagen II alpha 1	COL2A1	3
Collagen III alpha 1	COL3A1	3
Collagen IV alpha 1	COL4A1	3
Collagen IV alpha 2	COL4A2	3
Collagen IV alpha 3	COL4A3	3
Collagen IV alpha 4	COL4A4	3
Collagen IV alpha 5	COL4A5	3
Collagen IV alpha 6	COL4A6	3
Collagen IX alpha 2	COL9A2, EDM2	3
Collagen IX alpha 3	COL9A3	3
Collagen receptor	COLR	3
Collagen V alpha 1	COL5A1	3
Collagen V alpha 2	COL5A2	3
Collagen VI alpha 1	COL6A1	3
Collagen VI alpha 2	COL6A2	3
Collagen VI alpha 3	COL6A3	3

Collagen VII alpha 1	COL7A1	3
Collagen X alpha 1	COL10A1	3
Collagen X alpha 1	COL11A1	3
Collagen XI alpha 2	COL11A2	3
Collagen XVII alpha 1	COL17A1	3
Collagenic-like tail subunit of asymmetric acetylcholinesterase	COLQ	1
Collapsin		6
Colony-stimulating factor 1	CSF1	6
Colony-stimulating factor 1 receptor	CSF1R	6
Colony-stimulating factor 2	CSF2	6
Colony-stimulating factor 2 alpha receptor	CSF2RA	6
Colony-stimulating factor 2 beta receptor	CSF2RB	6
Colony-stimulating factor 3	CSF3	6
Colony-stimulating factor 3 receptor	CSF3R	6
Complex V	MTATP6	1
Cone-rod homeobox-containing gene	CRX	6
Contactin	CNTN1	6
Core-binding factor, alpha 1	CBFA1	6
Core-binding factor, alpha 2	CBFA2	6
Core-binding factor, beta	CBFB	6
Corticotrophin-releasing hormone	CRH	2
Corticotrophin-releasing hormone receptor	CRHR1	2
Creatine kinase - B and m	CKBE	1
Creb binding protein	CREBBP	6
Cryptochrome 1	CRY1	3
Cryptochrome 2	CRY2	3
Crystallin, alpha A	CRYAA	3
Crystallin, alpha B	CRYAB	3
Crystallin, beta B2	CRYBB2	3
Crystallin, gamma A	CRYGA	3
c-src tyrosine kinase	CSK	6
Cu <sup>2+</sup> transporting ATPase alpha polypeptide	ATP7A	1
Cu <sup>2+</sup> transporting ATPase beta polypeptide	ATP7B	1
Cubilin	CUBN	2
Cyclic AMP response element binding protein	CREB	6
Cyclic AMP response element modulator	CREM	6
Cyclic AMP-dependent protein kinase	PKA	1
Cyclic nucleotide gated channel alpha 1, CNGA1	CNGA1	5
Cyclic nucleotide gated channel alpha 3, CNGA3	CNGA3	5
Cyclic nucleotide phosphodiesterase 1B	PDE1B	1
Cyclic nucleotide phosphodiesterase 1B1	PDE1B1	1
Cyclic nucleotide phosphodiesterase 2A3	PDE2A3	1
Cyclic nucleotide phosphodiesterase 3A	PDE3A	1
Cyclic nucleotide phosphodiesterase 3B	PDE3B	1

Cyclic nucleotide phosphodiesterase 4A	PDE4A	1
Cyclic nucleotide phosphodiesterase 4C	PDE4C	1
Cyclic nucleotide phosphodiesterase 5A	PDE5A	1
Cyclic nucleotide phosphodiesterase 6A	PDE6A	1
Cyclic nucleotide phosphodiesterase 6B	PDE6B	1
Cyclic nucleotide phosphodiesterase 7	PDE7	1
Cyclic nucleotide phosphodiesterase 8	PDE8	1
Cyclic nucleotide phosphodiesterase 9A	PDE9A	1
Cyclin A	CCNA	6
Cyclin B	CCNB	6
Cyclin C	CCNC	6
Cyclin D	CCND1	6
Cyclin E	CCNE	6
Cyclin F	CCNF	6
Cyclin-dependent kinase 1	CDK1	6
Cyclin-dependent kinase 10	CDK10	6
Cyclin-dependent kinase 2	CDK2	6
Cyclin-dependent kinase 3	CDK3	6
Cyclin-dependent kinase 4	CDK4	6
Cyclin-dependent kinase 5	CDK5	6
Cyclin-dependent kinase 6	CDK6	6
Cyclin-dependent kinase 7	CDK7	6
Cyclin-dependent kinase 8	CDK8	6
Cyclin-dependent kinase 9	CDK9	6
Cyclin-dependent kinase inhibitor 1A (P21, CIP1)	CDKN1A	6
Cyclin-dependent kinase inhibitor 1B (P27, KIP1)	CDKN1B	6
Cyclin-dependent kinase inhibitor 1C (P57, KIP2)	CDKN1C	6
Cyclin-dependent kinase inhibitor 2A (p16)	CDKN2A	6
Cyclin-dependent kinase inhibitor 3	CDKN3	6
Cyclooxygenase 1	COX1	1
Cyclooxygenase 2	COX2	1
CYP11A1	CYP11A1	1
CYP11B1	CYP11B1	1
CYP11B2	CYP11B2	1
CYP17	CYP17	1
CYP19	CYP19	1
CYP1A1	CYP1A1	1
CYP1A2	CYP1A2	1
CYP1B1	CYP1B1	1
CYP21	CYP21	1
CYP24	CYP24	1
CYP27	CYP27	1
CYP27B1	PDDR	1
CYP2A1	CYP2A1	1

CYP2A13	CYP2A13	1
CYP2A3	CYP2A3	1
CYP2A6V2	CYP2A6V2	1
CYP2A7	CYP2A7	1
CYP2B6	CYP2B6	1
CYP2C18	CYP2C18	1
CYP2C19	CYP2C19	1
CYP2C8	CYP2C8	1
CYP2C9	CYP2C9	1
CYP2D6	CYP2D6	1
CYP2E1	CYP2E1	1
CYP2F1	CYP2F1	1
CYP2J2	CYP2J2	1
CYP3A3	CYP3A3	1
CYP3A4	CYP3A4	1
CYP3A5	CYP3A5	1
CYP3A7	CYP3A7	1
CYP4A11	CYP4A11	1
CYP4B1	CYP4B1	1
CYP4F2	CYP4F2	1
CYP4F3	CYP4F3	1
CYP51	CYP51	1
CYP5A1	CYP5A1	1
CYP7A	CYP7A	1
CYP8	CYP8	1
Cystathionase	CTH	1
Cystathione beta synthase	CBS	1
Cystic fibrosis transmembrane conductance regulator, CFTR	CFTR	5
Cystinosin	CTNS	2
Cytidine deaminase	CDA	1
Cytochrome b-5	CYB5	1
DAX1 nuclear receptor	DAX1	4
Deafness autosomal dominant 5	DFNA5	5
Deafness dystonia peptide	DDP	5
Defender against cell death 1	DAD1	6
Deleted in azospermia	DAZ	6
Deleted in colorectal carcinoma	DCC	6
Deleted in malignant brain tumours 1	DMBT1	6
Delta aminolevulinate dehydratase	ALAD	1
Delta(4)-3-oxosteroid 5-beta-reductase		1
Delta-7-dehydrocholesterol reductase	DHCR7	1
Dentin sialophosphoprotein	DSPP	6
Deoxyuridine triphosphatase; dUTPase		1
Desert hedgehog, dhh		6
DHEA sulfotransferase	STD	1
Diaphanous 1	DIAPH1	5

Diaphanous 2	DIAPH2	5
Diastrophic dysplasia sulfate transporter	DTD	2
Dihydrolipoamide branched chain transacylase	DBT	5
Dihydrolipoamide dehydrogenase	DLD	5
Dihydrolipoyl dehydrogenase 2	PDHA	1
Dihydrolipoyl transacetylase	PDHA	1
Dihydroorotase		1
Dihydroxyacetonephosphate acyltransferase	DHAPAT	1
Disrupted meiotic cDNA 1, homolog	DMC1	6
Distal-less homeobox 1	DLX1	6
Distal-less homeobox 2	DLX2	6
Distal-less homeobox 3	DLX3	6
Distal-less homeobox 4	DLX4	6
Distal-less homeobox 5	DLX5	6
Distal-less homeobox 6	DLX6	6
DNA damage binding protein, DDB1	DDB1	3
DNA damage binding protein, DDB2	DDB2	3
DNA directed polymerase, alpha	POLA	1
DNA glycosylases		1
DNA helicases		1
DNA Ligase 1	LIG1	1
DNA methyltransferase	DNMT	1
DNA polymerase 1		1
DNA polymerase 2		1
DNA polymerase 3		1
DNA primase		1
DNA-damage-inducible transcript 3	DDIT3	3
DNA-dependant RNA polymerase		1
DOPA decarboxylase	DDC	1
Doublecortin, DCX	DCX	3
Duffy blood group	FY	2
Dynamin	DNM1	6
Dynein		6
Dyskerin	DKC1	3
Dystonia 1	DYT1	3
Dystonia 3	DYT3	3
Dystonia 6	DYT6	3
Dystonia 7	DYT7	3
Dystonia 9	CSE	3
Dystrophia myotonica	DM, DMPK	1
Dystrophia myotonica, atypical	DM2	1
Dystrophin	DMD	3
Dystrophin-associated glycoprotein 35kD, SCGD	SGCD	3
Dystrophin-associated glycoprotein 35kD, SGSG	SGCG	3
Dystrophin-associated glycoprotein 43kD	SGCB	3

Dystrophin-associated glycoprotein 50kD	SGCA	3
E74-like factor 1, ELF1	ELF1	6
EB1		6
Ectodermal Dysplasia 1 gene	ED1	3
Electron-transferring-flavoprotein alpha	ETFA	2
Electron-transferring-flavoprotein beta	ETFB	2
Electron-transferring flavoprotein dehydrogenase	ETFDH	1
Empty spiracles (drosophila) homologue 1	EMX1	6
Empty spiracles (drosophila) homologue 2	EMX2	6
Endobrevin	VAMP8	5
Endocardial fibroelastosis 2 gene	EFE2	3
Endometrial bleeding-associated factor	EBAF	6
Endothelin 1	EDN1	5
Endothelin 2	EDN2	5
Endothelin 3	EDN3	5
Endothelin converting enzyme	ECE1	5
Endothelin receptor type A	EDNRA	5
Endothelin receptor type B	EDNRB	5
Engrailed-1	ENI	6
Engrailed-2	EN2	6
Enolase	ENO1	1
Enoyl CoA isomerase		1
Enterokinase	PRSS7,ENTK	1
Ephrin receptor tyrosine kinase A	EPHA	6
Ephrin receptor tyrosine kinase B	EPHB	6
Ephrin-A	EFNA	6
Ephrin-B	EFNB	6
Epidermal growth factor	EGF	6
Epidermal growth factor receptor	EGFR	6
Epilepsy, benign neonatal 4 gene	ICCA	1
Epilepsy, female restricted	EFMR	1
Epilepsy, progressive myoclonic 2 gene	EPM2A	1
Erythrocyte membrane protein band 4.1	EPB41	3
Erythrocyte membrane protein band 4.2	EPB42	3
Erythrocyte membrane protein band 7.2	EPB72	3
Erythroid kruppel-like factor	EKLF	6
Erythropoietin	EPO	4
Erythropoietin receptor	EPOR	4
Estrogen receptor	ESR	6
Eukaryotic initiation translation factor	EIF4E	6
EWS RNA-binding protein	EWSR1	6
Excision repair complementation group 1 protein	ERCC1	1
Excision repair complementation group 2 protein	ERCC2	1

Excision repair complementation group 2 protein	ERCC3	1
Excision repair complementation group 4 protein	ERCC4	1
Excision repair complementation group 6 protein	ERCC6	1
Exostosin 1	EXT1	3
Exostosin 2	EXT2	3
Exostosin 3	EXT3	3
Eyes absent 1	EYA1	6
Eyes absent 2	EYA2	6
Eyes absent 3	EYA3	6
Faciogenital dysplasia	FGD1, FGDY	2
Factor 1 (No. one)	F1	4
Factor B, properdin		4
Factor D		4
Factor H	HF1	4
Factor I (letter 1)	IF	4
Factor III	F3	4
Factor IX	F9	4
Factor V	F5	4
Factor VII	F7	4
Factor VIII	F8	4
Factor X	F10	4
Factor XI	F11	4
Factor XII	F12	4
Factor XIII A & B	F13A & F13B	4
Fanconi anemia, complementation group A	FANCA	2
Fanconi anemia, complementation group C	FANCC	2
Fanconi anemia, complementation group D	FANCD	2
Fc fragment of IgG, high affinity IA, receptor for	FCGR1A	6
Fc fragment of IgG, low affinity IIa, receptor for (CD32)	FCGR2A	6
Fc fragment of IgG, low affinity IIIa, receptor for (CD16)	FCGR3A	6
Fc receptor		4
Fertilin protein	FTNB	6
Fibrillin 1	FBN1	6
Fibrillin 2	FBN2	6
Fibroblast growth factor	FGF1	6
Fibroblast growth factor receptor 1	FGFR1	6
Fibroblast growth factor receptor 2	FGFR2	6
Fibroblast growth factor receptor 3	FGFR3	6
Fibronectin precursor	FN1	6
Flavin-containing monooxygenase 1	FMO1	1
Flavin-containing monooxygenase 2	FMO2	1
Flavin-containing monooxygenase 3	FMO3	1



Flavin-containing monooxygenase 4	FMO4	1
Flightless-II, Drosophila homolog of	FLII	6
Folic acid receptor	FOLR	6
Follicle stimulating hormone receptor	FSHR,ODG1	6
Follicle stimulating hormone, FSH	FSHB	6
Follicular lymphoma variant translocation 1	FVT1	4
Follistatin		6
Forkhead rhabdomyosarcoma gene	FKHR	6
Forkhead transcription factor 10	FKHL10	6
Forkhead transcription factor 14	FKHL14	6
Forkhead transcription factor 7	FKHL7	6
Formiminotransferase		1
Fragile site, folic acid type, rare, fra(X) A	FRAXA	5
Fragile site, folic acid type, rare, fra(X) E	FRAXE	5
Fragile site, folic acid type, rare, fra(X) F	FRAXF	5
Frataxin	FRDA	6
Fringe secreted protein, lunatic	LFNG	6
Fringe secreted protein, manic	MFNG	6
Fringe secreted protein, radical	RFNG	6
Fructose-1,6-diphosphatase	FBP1	1
Fucosyltransferase 6	FUT6	2
Fukuyama type congenital muscular dystrophy	FCMD	6
Fumarase	FH	1
Fumarylacetoacetase	FAH	1
G/T mismatch binding protein	GTBP,MSH6	6
GABA receptor, alpha 1	GABRA1	5
GABA receptor, alpha 2	GABRA2	5
GABA receptor, alpha 3	GABRA3	5
GABA receptor, alpha 4	GABRA4	5
GABA receptor, alpha 5	GABRA5	5
GABA receptor, alpha 6	GABRA6	5
GABA receptor, beta 1	GABRB1	5
GABA receptor, beta 2	GABRB2	5
GABA receptor, beta 3	GABRB3	5
GABA receptor, gamma 1	GABRG1	5
GABA receptor, gamma 2	GABRG2	5
GABA receptor, gamma 3	GABRG3	5
GABA transaminase	ABAT	1
Gadd45 (growth arrest & DNA-damage-inducible protein)		1
Galactocerebrosidase	GALC	1
Galactokinase	GALK1	1
Galactose 1-phosphate uridyl-transferase	GALT	1
Galactosyltransferase 1	GT1	6
Galactosyltransferase, alpha 1,3	GGTA1	6
Galactosyltransferase, beta 3	B3GALT	6
Galanin	GAL	5
Galanin receptor	GALNR1	5

Gamma-glutamyl carboxylase	GGCX	2
Gap junction protein alpha 1	GJA1	2
Gap junction protein alpha 3	GJA3	2
Gap junction protein alpha 8	GJA8	2
Gap junction protein beta 1	GJB1	2
Gap junction protein beta 2	GJB2	2
Gap junction protein beta 3	GJB3	2
Gastric Intrinsic factor, GIF	GIF	1
Gastrin	GAS	6
Gastrin releasing peptide	GRP	2
Gastrulation brain homeobox 2	GBX2	6
GDP dissociation inhibitor I	GDI 1	6
Gelsolin	GSN	6
Geniospasm 1	GSM1	6
Gephyrin		5
Glial-cell derived neurotrophic factor (GDNF) receptor		5
Glial-cell derived neurotrophic factor, GDNF	GDNF	5
Glioma chloride ion channel, GCC		6
Glucagon receptor	GCGR	6
Glucagon-like peptide receptor 1	GLPLR	6
Glucocorticoid receptor	GRL	6
Glucose-6-phosphatase translocase	G6PT1	1
Glucosidase, acid alpha	GAA	1
Glucosidase, acid beta	GBA	1
Glutamate decarboxylase, GAD	GAD1	1
Glutamate-cysteine ligase	GLCLC	1
Glutathione	GSH	2
Glutathione peroxidase, GPX1	GPX1	1
Glutathione peroxidase, GPX2	GPX2	1
Glutathione reductase, GSR	GSR	1
Glutathione S-transferase mu 1, GSTM1	GSTM1	1
Glutathione S-transferase mu 4, GSTM4		1
Glutathione S-transferase theta 1, GSTT1	GSTT1	1
Glutathione S-transferase theta 2, GSTT2		1
Glutathione S-transferase, GSTP1	GSTP1	1
Glutathione S-transferase, GSTZ1	GSTZ1	1
Glutathione synthetase	GSS	1
Glyceraldehyde-3-phosphate dehydrogenase, GAPDH	GAPDH	1
Glycerol kinase	GK	1
Glycinamide ribonucleotide (GAR) transformylase	GART	1
Glycine dehydrogenase	GLDC	1
Glycine receptor, alpha	GLRA2	5
Glycine receptor, beta		5
Glycogen branching enzyme	GBE1	1

Glycogen phosphorylase	PYGL	1
Glycogen synthase 1 (muscle)	GLYS1	1
Glycogen synthase 2 (liver)	GYS2	1
Glycosyltransferases, ABO blood group	ABO	1
Glypican 3	GPC3, SDYS	6
GM2 ganglioside activator protein, GM2A	GM2A	1
Gonadotropin releasing hormone	GNRH	6
Gonadotropin releasing hormone receptor	GNRHR	6
Goosecoid GSC		6
Green cone pigment	GCP	3
Growth arrest-specific homeobox	GAX	6
Growth factor receptor-bound protein 2	GRB2	6
Growth hormone 1	GH1	6
Growth hormone 2 (placental)	GH2	6
Growth hormone receptor	GHR	6
Growth hormone releasing hormone (GHRH)	GHRH	6
Growth hormone releasing hormone receptor	GHRHR	6
Growth/differentiation factor 5	GDF5	6
Growth-regulated protein precursor, GRO	GRO	4
GTP cyclohydrolase 1	GCH1	6
GTPase-activating protein, GAP	RASA1	6
Guanidinoacetate N-methyltransferase	GAMT	1
Guanine nucleotide-binding protein, alpha activating activity polypeptide, GNAO	GNA01	5
Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 1, GNA11	GNA11	5
Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 2, GNA12	GNA12	5
Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 3, GNA13	GNA13	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS1	GNAS1	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS2	GNAS2	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS3	GNAS3	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS4	GNAS4	5
Guanine nucleotide-binding protein, alpha transducing activity polypeptide, GNAT1	GNAT1	5
Guanine nucleotide-binding protein, alpha transducing activity polypeptide, GNAT2	GNAT2	5
Guanine nucleotide-binding protein, beta polypeptide 3	GNB3	5
Guanine nucleotide-binding protein, gamma polypeptide 5	GNG5	5

Guanine nucleotide-binding protein, q polypeptide	GNAQ	5
Guanylate cyclase 2D, membrane (retina-specific)	GUCY2D	1
Guanylate cyclase activator 1A (retina)	GUCA1A	1
Guanylate kinase		1
Gustducin, alpha (taste-specific G protein)	GDCA	5
Haeme regulated inhibitor kinase		1
Haemoglobin epsilon		2
Hairless	HR	6
Haptoglobin, alpha 1	HPA1	4
Haptoglobin, alpha 2	HPA2	4
Haptoglobin, beta	HPB	4
Heat shock protein, HSP60		4
Heat shock protein, HSP70		4
Heat shock protein, HSP90		4
Heat shock protein, HSPA1		4
Heat shock protein, HSPA2		4
Hela tumor suppression gene	HTS1	6
Hemochromatosis	HFE	2
Hemopexin	HPX	4
Heparan sulfamidase		1
Heparin binding epidermal growth factor	HBEGF	6
Hepatic nuclear factor-3-beta	HNF3B	1
Hepatic nuclear factor-4-alpha	HNF4A	1
Hepatitis B virus integration site 1	HVBS1	4
Hepatitis B virus integration site 2	HVBS6	4
Hepatocyte growth factor	HGF	6
Hexosaminidase A	HEXA,TSD	1
Hexosaminidase B	HEXB	1
High mobility group protein 1	HMG1	6
High mobility group protein 2	HMG2	6
High mobility group protein C	HMGIC	6
High mobility group protein Y	HMG1Y	6
Histone family H1	H1	6
Histone family H2	H2	6
Histone family H3	H3	6
Histone family H4	H4	6
HLA-B associated transcript 1	BAT1	4
HLH transcription factor HAND1	HAND1	6
HLH transcription factor HAND2	HAND2	6
HMG-CoA lyase	HMGCL	1
HMG-CoA reductase	HMGCR	1
HMG-CoA synthase	HMGCS2	1
Holocarboxylase synthetase	HLCS	1
Holoprosencephaly 1	HPE1	6
Holoprosencephaly 2	HPE2	6

Holoprosencephaly 3	HPE3	6
Holoprosencephaly 4	HPE4	6
Homeobox (HOX) gene A1	HOXA1	6
Homeobox (HOX) gene A10	HOXA10	6
Homeobox (HOX) gene A11	HOXA11	6
Homeobox (HOX) gene A12	HOXA12	6
Homeobox (HOX) gene A13	HOXA13	6
Homeobox (HOX) gene A2	HOXA2	6
Homeobox (HOX) gene A3	HOXA3	6
Homeobox (HOX) gene A4	HOXA4	6
Homeobox (HOX) gene A5	HOXA5	6
Homeobox (HOX) gene A6	HOXA6	6
Homeobox (HOX) gene A7	HOXA7	6
Homeobox (HOX) gene A8	HOXA8	6
Homeobox (HOX) gene A9	HOXA9	6
Homeobox (HOX) gene B1	HOXB1	6
Homeobox (HOX) gene B2	HOXB2	6
Homeobox (HOX) gene B3	HOXB3	6
Homeobox (HOX) gene B4	HOXB4	6
Homeobox (HOX) gene B5	HOXB5	6
Homeobox (HOX) gene B6	HOXB6	6
Homeobox (HOX) gene B7	HOXB7	6
Homeobox (HOX) gene B8	HOXB8	6
Homeobox (HOX) gene B9	HOXB9	6
Homeobox (HOX) gene C13	HOXC13	6
Homeobox (HOX) gene C4	HOXC4	6
Homeobox (HOX) gene C8	HOXC8	6
Homeobox (HOX) gene C9	HOXC9	6
Homeobox (HOX) gene D1	HOXD1	6
Homeobox (HOX) gene D10	HOXD10	6
Homeobox (HOX) gene D12	HOXD12	6
Homeobox (HOX) gene D13	HOXD13	6
Homeobox (HOX) gene D3	HOXD3	6
Homeobox (HOX) gene D4	HOXD4	6
Homeobox (HOX) gene D8	HOXD8	6
Homeobox (HOX) gene D9	HOXD9	6
Homeobox 11	HOX11	6
Homeobox HB24	HLX1	6
Homeobox HB9	HLXB9	6
Homeobox, PROX1	PROX1	6
HSSB, replication protein		1
Human atonal gene	ATOH1	6
Human chorionic gonadotrophin, hCG	CG	6
Human placental lactogen	CSH1	6
Huntingtin	HD	2
Hypoxanthine-guanine phosphoribosyltransferase, HGPRT	HPRT	1

Hypoxia inducible factor 1	HIF1A	1
Hypoxia inducible factor 2		1
IC7 A and B		4
Iduronate 2 sulphatase	IDS	1
Ikaros gene	IKAROS	6
Immunoglobulin alpha (IgA)	IGHA	4
Immunoglobulin delta (IgD)	IGHD	4
Immunoglobulin E (Ig ) reponsivigness gene	IGER	4
Immunoglobulin E (IgE) serum concentration regulator gene	IGES	4
Immunoglobulin epsilon (IgE)	IGHE	4
Immunoglobulin gamma (IgG) 2	IGHG2	4
Immunoglobulin heavy mu chain	IGHM	4
Immunoglobulin J polypeptide	IGJ	4
Immunoglobulin kappa constant region	IGKC	4
Immunoglobulin kappa variable region	IGKV	4
Indian hedgehog, ihh	IHH	6
Inhibin, alpha	INHA	6
Inhibin, beta A	INHBA	6
Inhibin, beta B	INHBB	6
Inhibin, beta C	INHBC	6
Inosine monophosphate dehydrogenase, IMPDH		1
Inositol 1,4,5-triphosphate receptor 1	ITPR1	6
Inositol 1,4,5-triphosphate receptor 3	ITPR3	6
Insulin	INS	6
Insulin promotor factor 1	IPF1	6
Insulin receptor	INSR	6
Insulin receptor substrate-1	IRS1	6
Insulin-like growth factor 1	IGF1	6
Insulin-like growth factor 1 receptor	IGF1R	6
Insulin-like growth factor 2	IGF2	6
Insulin-like growth factor 2 receptor	IGF2R	6
Integrin beta 1	ITGB1	6
Integrin beta 2	ITGB2	6
Integrin beta 3	ITGB3	6
Integrin beta 4	ITGB4	6
Integrin beta 5	ITGB5	6
Integrin beta 6	ITGB6	6
Integrin beta 7	ITGB7	6
Integrin, alpha 1	ITGA1	6
Integrin, alpha 2	ITGA2	6
Integrin, alpha 3	ITGA3	6
Integrin, alpha 4	ITGA4	6
Integrin, alpha 5	ITGA5	6
Integrin, alpha 6	ITGA6	6
Integdn, alpha 7	ITGA7	6

Integrin, alpha 8	ITGA8	6
Integrin, alpha 9	ITGA9	6
Integrin, alpha M	ITGAM	6
Integrin, alpha X	ITGAX	6
Inter-alpha-trypsin inhibitor, IATI		1
Intercellular adhesion molecule 1	ICAM1	4
Intercellular adhesion molecule 2	ICAM2	4
Intercellular adhesion molecule 3	ICAM3	4
Interferon alpha	IFNA1	4
Interferon beta	IFNB	4
Interferon gamma	IFNG	4
Interferon gamma receptor 1	IFNGR1	4
Interferon gamma receptor 2	IFNGR2	4
Interferon regulatory factor 1	IRF1	4
Interferon regulatory factor 4	IRF4	4
Interleukin(IL) 1 receptor	IL1R	4
Interleukin(IL) 1, alpha	IL1A	4
Interleukin(IL) 1, beta	IL1B	4
Interleukin(IL) 10	IL10	4
Interleukin(IL) 10 receptor	IL10R	4
Interleukin(IL) 11	IL11	4
Interleukin(IL) 11 receptor	IL11R	4
Interleukin(IL) 12	IL12	4
Interleukin(IL) 12 receptor, beta 1	IL12RB1	4
Interleukin(IL) 13	IL13	4
Interleukin(IL) 13 receptor	IL13R	4
Interleukin(IL) 2	IL2	4
Interleukin(IL) 2 receptor, alpha	IL2RA	4
Interleukin(IL) 2 receptor, gamma	IL2RG	4
Interleukin(IL) 8	IL3	4
Interleukin(IL) 3 receptor	IL3R	4
Interleukin(IL) 4	IL4	4
Interleukin(IL) 4 receptor	IL4R	4
Interleukin(IL) 5	IL5	4
Interleukin(IL) 5 receptor	IL5R	4
Interleukin(IL) 6	IL6	4
Interleukin(IL) 6 receptor	IL6R	4
Interleukin(IL) 7	IL7	4
Interleukin(IL) 7 receptor	IL7R	4
Interleukin(IL) 8	IL8	4
Interleukin(IL) 8 receptor	IL8R	4
Interleukin(IL) 9	IL9	4
Interleukin(IL) 9 receptor	IL9R	4
Interleukin(IL) receptor antagonist 1	IL1RN, ILLRA	4
IP3 kinase		1
Isocitrate dehydrogenase		1
Isovaleric acid CoA dehydrogenase	IVD	1

Janus kinase 1	JAK1	6
Janus kinase 2	JAK2	6
Janus kinase 3	JAK3	6
Kallman syndrome gene 1	KAL1	6
Kell blood group precursor	XK, KEL	2
Keratin 1	KRT1	3
Keratin 10	KRT10	3
Keratin 11	KRT11	3
Keratin 12	KRT12	3
Keratin 13	KRT13	3
Keratin 14	KRT14	3
Keratin 15	KRT15	3
Keratin 16	KRT16	3
Keratin 17	KRT17, PCHCI	3
Keratin 18	KRT18	3
Keratin 2	KRT2	3
Keratin 3	KRT3	3
Keratin 4	KRT4	3
Keratin 5	KRT5	3
Keratin 6	KRT6	3
Keratin 7	KRT7	3
Keratin 8	KRT8	3
Keratin 9	KRT9	3
Ketohexokinase	KHK	1
Kinectin	KTN1	6
Kinesin, heavy chain	KNSL1	6
Kinesin, light chain	KNS2	6
L1 cell adhesion molecule	L1CAM	5
Lactotransferrin	LTF	2
Lamin A/C	LMNA	6
Laminin 5, alpha 3	LAMA3	6
Laminin 5, beta 3	LAMB3	6
Laminin 5, gamma 2	LAMC2	6
Laminin M	LAMM	6
Laminin receptor 1	LAMR1	6
Latent transforming growth factor-beta binding protein 2	LTBP2	6
Leptin	LEP	6
Leptin receptor	LEPR	6
Leukaemia inhibitory factor	LIF	6
Leukaemia inhibitory factor receptor	LIFR	6
Leukin		4
Leukocyte-specific transcript 1	LST-1	4
Leukotriene A4 hydrolase		4
Leukotriene A4 synthase	LTA4S	1
Leukotriene B4 receptor		4
Leukotriene B4 synthase	LTB4S	1



Leukotriene C4 receptor		4
Leukotriene C4 synthase	LTC4S	1
Leukotriene D4/E4 receptor		4
LH/choriogonadotropin (CG) receptor	LHCGR	6
LIM homeobox protein 1	LHX1	6
LIM homeobox protein 2	LHX2	6
LIM homeobox protein 3	LHX3	6
LIM homeobox protein 4	LHX4	6
LIM homeobox transcription factor 1, beta	LMX1B	6
Limb girdle muscular dystrophy 1 A	LGMD1A	6
Limb girdle muscular dystrophy 1 B	LGMD1B	6
Limb girdle muscular dystrophy 2G	LGMD2G	6
Limb girdle muscular dystrophy 2H	LGMD2H	6
Limbic associated membrane protein	LAMP	6
LIM-domain only protein 1	LM01	6
LIM-domain only protein 2	LM02	6
LIM-domain only protein 3	LM03	6
LIM-domain only protein 4	LM04	6
Lipoma-preferred partner gene	LPP	6
Lipoprotein receptor, Low Density	LDLR	2
Lipoxygenase 12 (platelets)	LOG12	4
Lipoxygenase 5 (leukocytes)		4
Long QT-type 2 potassium channels	LQT2, KCNH2	2
Loricrin	LOR	3
Low density lipoprotein receptor-related protein LRP precursor		2
Luteinizing hormone, beta chain	LHB	6
Lymphoblastic leukemia derived sequence 1	LYL1	4
Lymphocyte-specific protein tyrosine kinase	LCK	4
Lymphoid enhancer-binding factor	LEF-1	6
Lysosome-associated membrane protein 1	LAMP1	6
Lysosome-associated membrane protein 2	LAMP2	6
MAD (mothers against decapentaplegic, Drosophila) homologue 2	MADH2	6
MAD (mothers against decapentaplegic, Drosophila) homologue 3	MADH3	6
MAD (mothers against decapentaplegic, Drosophila) homologue 4	MADH4	6
MADS box transcription-enhancer factor 2A	MEF2A	6
MADS box transcription-enhancer factor 2B	MEF2B	6
MADS box transcription-enhancer factor 2C	MEF2C	6
MADS box transcription-enhancer factor 2D	MEF2D	6
Malate dehydrogenase, mitochondrial	MDH2	1
Malignant proliferation, eosinophil gene	MPE	4
Malonyl CoA decarboxylase		1
Malonyl CoA transferase		1
Mannosidase, alpha B lysosomal	MANB	1

Mannosidase, beta A lysosomal	MANBA	1
MAPK kinase 1	MAPKK1; MEK1	6
MAPK kinase 4	MAPKK4; MEK4;	6
SERK1		
MAPK kinase 6	MAPKK6;MEK6	6
MAPKK kinase	MAPKKK	6
Matrix Gla protein	MGP	6
Matrix metalloproteinase 1	NMP1	1
Matrix metalloproteinase 10	NMP10	1
Matrix metalloproteinase 11	MMP11	1
Matrix metalloproteinase 12	MMP12	1
Matrix metalloproteinase 13	MMP13	1
Matrix metalloproteinase 14	MMP14	1
Matrix metalloproteinase 15	MMP15	1
Matrix metalloproteinase 16	MMP16	1
Matrix metalloproteinase 17	MMP17	1
Matrix metalloproteinase 18	MMP18	1
Matrix metalloproteinase 19	MMP19	1
Matrix metalloproteinase 2	MMP2	1
Matrix metalloproteinase 3	MMP3, STMY1	1
Matrix metalloproteinase 4	MMP4	1
Matrix metalloproteinase 5	MMP5	1
Matrix metalloproteinase 6	MMP6	1
Matrix metalloproteinase 7	MMP7	1
Matrix metalloproteinase 8	MMP8	1
Matrix metalloproteinase 9	MMP9	1
MAX-interacting protein 1	MXI1	6
MEK kinase, MEKK		1
Melanocortin 1 receptor	MC1R	2
Melanocortin 2 receptor	MC2R	2
Melanocortin 4 receptor	MC4R	2
Menin	MEN1	6
Mesoderm-specific transcript	MEST	6
Methionine adenosyltransferase	MAT1A, MAT2A	1
Methionine synthase	MTR	1
Methionine synthase reductase	MTRR	1
Methylguanine-DNA methyltransferase	MGMT	1
Methylmalonyl-CoA mutase	MUT	1
Mevalonate kinase	MVK	1
MHC Class 1: A		4
MHC Class 1: B		4
MHC Class 1: C		4
MHC Class 1: LMP-2, LMP-7		4
MHC Class 1: Tap1	ABCR, TAP1	4
MHC Class II: DP	HLA-DPB1	4
MHC Class II: DQ		4
MHC Class II: DR		4

MHC Class II: Tap2	TAP2,PSF2	4
MHC Class II:Complementation group A	MHC2TA	4
MHC Class II:Complementation group B	RFXANK	4
MHC Class II:Complementation group C	RFX5	4
MHC Class II:Complementation group D	RFXAP	4
Microphthalmia-associated transcription factor	MITF	6
Microsomal triglyceride transfer protein	MTP	2
Microtubule associated protein	MAP	3
Midline I	MID1	6
Mismatch repair gene, PMSL1	PMS1	6
Mismatch repair gene, PMSL2	PMS2	6
Mitochondrial trifunctional protein, alpha subunit	HADHA	1
Mitochondrial trifunctional protein, beta subunit	HADHB	1
Mitogen-activated protein (MAP) kinase	MAPK	6
Molybdenum cofactor synthesis 1	MOCS1	1
Molybdenum cofactor synthesis 2	MOCS2	1
Monoamine oxidase A	MAOA	1
Monoamine oxidase B	MAOB	1
Monocyte chemoattractant protein 1	MCP1	4
Motilin	MLN	6
Msh homeobox homolog 1	MSX1	6
Msh homeobox homolog 2	MSX2	6
Mucopolidoses	GNPTA	1
Mulibrey nanism	MUL	2
Multidrug resistance associated protein	MRP	6
Muscarinic receptor, M1	CHRM1	5
Muscarinic receptor, M2	CHRM2	5
Muscarinic receptor, M3	CHRM3	5
Muscarinic receptor, M4	CHRM4	5
Muscarinic receptor, M5	CHRM5	5
Muscle phosphorylase	PYGM	1
Mutated in colorectal cancers, MCC	MCC	6
MutL homolog 1	MLH1	6
MutS homolog 2	MSH2	6
MutS homolog 3	MSH3	6
Myelin protein peripheral 22	PMP22	3
Myelin protein zero	MPZ	3
Myelodysplasia syndrome 1 gene	MDS1	6
Myeloid leukemia factor-1	MLF1	4
Myocilin	MYOC	2
Myogenic factor 3	MYF3	6
Myogenic factor 4	MYF4	6
Myogenic factor 5	MYF5	6
Myomesin 1	MYOM1	3
Myomesin 2	MYOM2	3
Myosin 15	MYO15	3

Myosin 6	MY06	3
Myosin 7A	MY07A	3
Myosin, cardiac	MYH7	3
Myotubularin	MTM1	3
Na <sup>+</sup> , K <sup>+</sup> ATPase, alpha	ATP1A1	6
Na <sup>+</sup> , K <sup>+</sup> ATPase, beta 1	ATP1B1	6
Na <sup>+</sup> , K <sup>+</sup> ATPase, beta 2	ATP1B2	6
Na <sup>+</sup> /H <sup>+</sup> exchanger 1	NHE1	2
Na <sup>+</sup> /H <sup>+</sup> exchanger 2	NHE2	2
Na <sup>+</sup> /H <sup>+</sup> exchanger 3	NHE3	2
Na <sup>+</sup> /H <sup>+</sup> exchanger 4	NHE4	2
Na <sup>+</sup> /H <sup>+</sup> exchanger 5	NHE5	2
N-acetylgalactosamine-6-sulfate sulfatase	GALNS	1
N-acetylglucosamine-6-sulfatase	GNS	1
N-acetylglucosaminidase, alpha	NAGLU	1
N-acetyltransferase 1	NAT1	1
N-acetyltransferase 2	NAT2	1
NADH dehydrogenase		1
NADH dehydrogenase (ubiquinone) Fe-S protein 1	NDUFS1	1
NADH dehydrogenase (ubiquinone) Fe-S protein 4	NDUFS4	1
NADH dehydrogenase (ubiquinone) flavoprotein 1	NDUFV1	1
NADH-cytochrome b5 reductase	DIA1	1
NADPH-dependent cytochrome P450 reductase	POR	1
Natural resistance-associated macrophage protein 1	NRAMP1	4
NB6		4
Necdin	NDN	6
Nephronophthisis 1	NPHP1	2
Nephronophthisis 2	NPHP2	2
Nephrosis 1	NPHS1	2
Nerve growth factor	NGF	6
Nerve growth factor receptor	NGFR	6
Neural retina-specific gene	NRL	6
Neuraminidase sialidase	NEU	2
Neuregulin	HGL	6
Neurite growth-promoting factor 2	MDK	5
Neurite inhibitory protein		5
Neuroendocrine convertase 1	NEC1, PCSK1	1
Neurofibromin 1	NFI	6
Neurofibromin 2	NF2	6
Neurofilament protein, heavy	NFH	3
Neurofilament protein, NF68	NF68	3

Neuronal apoptosis inhibitory protein	NAIP	4
Neuronal molecule-1		4
Neuronal molecule-1 receptor		4
Neuropeptide Y	NPY	5
Neuropeptide Y receptor Y1	NPY1 R	5
Neuropeptide Y receptor Y2	NPY2R	5
Neurotrophic tyrosine kinase receptor 1	NTRK1	6
Neurotrophin 3	NTF3 or NT3	6
Neurturin	NRTN	6
Neutral endopeptidase		1
Neutrophil cystolic factor 1	NCF1	
Neutrophil cystolic factor 2	NCF2	
Niacin receptor		6
Nibrin	NBS1	6
Nitric oxide synthase 1, NOS1	NOS1	1
Nitric oxide synthase 2, NOS2	NOS2	1
Nitric oxide synthase 3, NOS3	NOS3	1
Nodal	NODAL	6
Noggin	NOG	6
Norrie disease protein	NDP	6
Notch 1	NOTCH1	6
Notch 2	NOTCH2	6
Notch 3	NOTCH3	6
Notch ligand -jagged 1	JAG 1, AGS	6
Nuclear factor I-kappa-B-like gene	IKBL	4
Nuclear factor kappa beta	NFKB	4
Nuclear factor of activated T cells (NFAT) complex, cytosolic	NFATC	6
Nuclear factor of activated T cells (NFAT) complex, preexisting component	NFATP	6
Nuclear mitotic apparatus protein 1	NUMA1	6
Nucleophosmin	NPM1	2
Nucleoside diphosphate kinase-A	NDPKA	1
Ocular albinism 1	OA1	3
Oculocutaneous albinism II	OCA2	3
Oligophrenin-1	OPHN1	6
Oncogene abl1	ABL1	6
Oncogene abl2		6
Oncogene akt1		6
Oncogene akt2	AKT2	6
Oncogene axl	AXL	6
Oncogene bcl2		6
Oncogene bcr/abl		6
Oncogene B-lym		6
Oncogene B-raf		6
Oncogene clk1		6
Oncogene c-myc		6

Oncogene cot		6
Oncogene crk		6
Oncogene crkl		6
Oncogene ect2		6
Oncogene ELK1	ELK1	6
Oncogene ELK2	ELK2	6
Oncogene emsl		6
Oncogene ERB		6
Oncogene ERB2		6
Oncogene ERBA		6
Oncogene ERBAL2		6
Oncogene ERG (early reponse gene)		6
Oncogene ETS1		6
Oncogene ETS2		6
Oncogene EVI1	EVI 1	6
Oncogene fes		6
Oncogene fgr		6
Oncogene fos	FOS	6
Oncogene fps		6
Oncogene GLI1	GLI	6
Oncogene GLI2	GLI2	6
Oncogene GLI3	GLI3	6
Oncogene gro1		6
Oncogene gro2		6
Oncogene Ha-ras	HRAS	6
Oncogene hs1		6
Oncogene hst	FGF4	6
Oncogene int1	WNT1	6
Oncogene int2	FGF3	6
Oncogene int3	Notch4	6
Oncogene int4	WNT3	6
Oncogene jun	JUN	6
Oncogene KIT	KIT, PBT	6
Oncogene LCO	LCO	6
Oncogene I-myc		6
Oncogene Ipsa		6
Oncogene lyn		6
Oncogene maf		6
Oncogene mas1		6
Oncogene mcf2		6
Oncogene mdm2	MDM2	6
Oncogene meI		6
Oncogene met	MET	6
Oncogene mos		6
Oncogene mpl		6
Oncogene MUM1	MUM1	6
Oncogene myb	MYB	6

Oncogene myc	MYC	6
Oncogene n-myc		6
Oncogene N-ras (neuroblastoma v-ras)	NRAS	6
Oncogene ovc		6
Oncogene pimi		6
Oncogene pti-1sea		6
Oncogene pvt1		6
Oncogene raf	RAF	6
Oncogene ralb		6
Oncogene rel		6
Oncogene ret	RET	6
Oncogene r-myc		6
Oncogene ros		6
Oncogene R-ras		6
Oncogene sis	PDGFB	6
Oncogene ski		6
Oncogene sno		6
Oncogene spil		6
Oncogene src		6
Oncogene tc21		6
Oncogene TEL	ETV6	6
Oncogene tim		6
Oncogene vavtrk		6
Oncogene v-Ki-ras2	KRAS2	6
Oncogene yes		6
Oncogene yuasa		6
Oncostatin M	OSM	6
Oncostatin M receptor	OSMR	6
Orexin	OX	6
Orexin 1 receptor	OXIR	6
Orexin 2 receptor	OX2R	6
Ornithine delta-aminotransferase	OAT	1
Ornithine transcarbamoylase	OTC, NME1	1
Orthodenticle (Drosophila) homolog 1	OTX1	6
Orthodenticle (Drosophila) homolog 2	OTX2	6
Osteocalcin		3
Osteonectin	ON	6
Osteopontin	OPN	6
Osteoprotegerin	OPG	6
Otoferlin	OTOF	5
Oxytocin	OXT	5
Oxytocin receptor	OXTR	5
p21-activated kinase 3	PAK3	6
Paired box homeotic gene 1	PAX1	6
Paired box homeotic gene 2	PAX2	6
Paired box homeotic gene 3	PAX3	6
Paired box homeotic gene 6	PAX6	6

Paired box homeotic gene 7	PAX7	6
Paired box homeotic gene 8	PAX8	6
Paired-like homeodomain transcription factor 2	PITX2	6
Paired-like homeodomain transcription factor 3	PITX3	6
Palmitoyl-protein thioesterase	PPT	2
Pancreatic amylase		1
Parathyroid hormone	PTH	6
Parathyroid hormone receptor	PTHRI	6
Parathyroid hormone related-peptide	PTHRP	6
Parathyroid hormone-like hormone	PTH LH	6
Parvalbumin	PVALB	6
Patched (Drosophila) homolog, PTCH	PTCH	6
PCNA (proliferating cell nuclear antigen)		1
Peanut-like 1	PNUTL1	4
Pendrin, PDS	PDS	2
Peptidylglycine alpha-amidating monooxygenase	PAM	1
Peripherin, PRPH		3
Peroxisomal membrane protein 1	PXMP1	3
Peroxisomal membrane protein 3	PXMP3	2
Peroxisome biogenesis factor 1	PEX1	2
Peroxisome biogenesis factor 19	PEX19	2
Peroxisome biogenesis factor 6	PEX6	2
Peroxisome biogenesis factor 7	PEX7	2
Peroxisome proliferative activated receptor, alpha	PPARA	2
Peroxisome proliferative activated receptor, gamma	PPARG	2
Peroxisome receptor 1	PXR1	2
Phenylethanolamine N-methyltransferase, PNMT	PNMT	1
Phosphatase & tensin homolog	PTEN	6
Phosphate regulating gene with homologies to endopeptidases on the X chromosome	PHEX	6
Phosphatidylinositol glycan, class A (paroxysmal nocturnal hemoglobinuria)	PIGA	6
Phosphatidylinositol transfer protein	PITPN	6
Phosphodiesterase 1/ nucleotide pyrophosphatase 1	PDNP1	6
Phosphodiesterase 1 / nucleotide pyrophosphatase 2	PDNP2	6
Phosphodiesterase 1 / nucleotide pyrophosphatase 3	PDNP3	6
Phosphofructokinase, liver	PFKL	1
Phosphofructokinase, muscle	PFKM	1
Phosphoglucose isomerase	GPI	1
Phosphoglycerate kinase 1	PGKL	1



Phosphoglycerate mutase 2	PGAM2	1
Phospholipase A2, group 10	PLA2G10	4
Phospholipase A2, group 1B	PLA2G1B	4
Phospholipase A2, group 2A	PLA2G2A	4
Phospholipase A2, group 2B	PLA2G2B	4
Phospholipase A2, group 4A	PLA2G4A	4
Phospholipase A2, group 4C	PLA2G4C	4
Phospholipase A2, group 5	PLA2G5	4
Phospholipase A2, group 6	PLA2G6	4
Phospholipase C alpha		4
Phospholipase C beta		4
Phospholipase C delta	PLCD1	4
Phospholipase C epsilon		4
Phospholipase C gamma	PLCG1	4
Phosphomannomutase 1	PMM1	6
Phosphomannomutase 2	PMM2	6
Phosphomannomutase 2	PMM2	2
Phosphorylase kinase deficiency, liver	PHK	1
Phosphorylase kinase, alpha 2	PHKA2	1
Phytanoyl-CoA hydroxylase	PHYH	6
Plakophilin 1	PKP1	2
Plasminogen	PLG	1
Plasminogen activator inhibitor 1	PAI 1	1
Plasminogen activator inhibitor 2	PAI 2	1
Plasminogen activator receptor, Urokinase	UPAR;PLAUR	3
Plasminogen activator, Tissue	PLAT;TPA	1
Plasminogen activator, Urokinase	UPA;PLAU	1
Platelet derived growth factor	PDGF	6
Platelet derived growth factor receptor	PDGFR	6
Plectin 1	PLEC1	2
Poly (ADP-ribose) synthetase	PARS	1
Poly(A) binding protein 2	PABP2	6
Postsynaptic density-95 protein	PSD95	5
Potassium inwardly-rectifying channel J1	KCNJL	5
Potassium inwardly-rectifying channel J11	KCNJL11	5
Potassium voltage-gated channel A1	KCNA1	5
Potassium voltage-gated channel E1	KCNE1	5
Potassium voltage-gated channel Q1	KCNQ1	5
Potassium voltage-gated channel Q2	KCNQ2	5
Potassium voltage-gated channel Q3	KCNQ3	5
Potassium voltage-gated channel Q4	KCNQ4	5
POU domain, class 1, transcription factor 1 (Piti)	POU1F1	6
POU domain, class 3, transcription factor 4	POU3F4	6
POU domain, class 4, transcription factor 3	POU4F3	6
Pre-B-cell leukemia transcription factor 1	PBX1	6
Preproglucagon	GCG;GLPL; GLP2	6

Procoliagen N-protease		1
Procollagen peptidase		1
Profibrinolysin		6
receptor)		
Prohibitin	PHB	6
Prolactin	PRL	6
Prolactin receptor	PRLR	6
Prolactin releasing hormone	PRH	6
Proliferin	PLF	6
Proline dehydrogenase	PRODH	1
Pro-melanin-concentrating hormone	PMCH	6
Promyelocytic leukemia gene	PML	6
Proopiomeianocortin	POMC	5
Prophet of Pit1	PROP1	6
Propionyl-CoA carboxylase, alpha	PCCA	1
Propionyl-CoA carboxylase, beta	PCCB	1
Prosaposin	PSAP	5
Prostaglandin (PG) D synthase, hematopoietic	PGDS	1
Prostaglandin isomerase		6
Prostaglandin-endoperoxidase synthase 2	PTGS2	6
Prostate cancer anti-metastasis gene KAI 1	KAI 1	6
Protease nexin 2	PN2	1
Protective protein for beta-galactosidase	PPGB	1
Protein C	PROC	4
Protein kinase A		1
Protein kinase B	PRKB	
Protein kinase C, alpha	PRKCA	1
Protein kinase C, gamma	PRKCG	1
Protein kinase DNA-activated	PRKDC	1
Protein kinase G		1
Protein phosphatase 1, regulatory (inhibitor) subunit 3	PPP1R3	1
Protein phosphatase 2, regulatory subunit A, beta isoform	PPP2R1B	1
Protein tyrosine phosphatase, non-receptor type 12	PTPN12	6
Protoporphyrinogen oxidase	PPOX	1
Pterin-4-alpha-carbinolamine	PCBD	
Purine nucleoside phosphorylase	NP	1
Purinergic receptor P1A1		5
Purinergic receptor P1A2		5
Purinergic receptor P1A3		5
Purinergic receptor P2X, 1	P2RX1	5
Purinergic receptor P2X, 2	P2RX2	5
Purinergic receptor P2X, 3	P2RX3	5
Purinergic receptor P X, 4	P2RX4	5
Purinergic receptor P2X, 5	P2RX5	5

Purinergic receptor P9X, 6	P2RX6	5
Purinergic receptor P2X, 7	P2RX7	5
Purinergic receptor P2Y, 1	P2RY1	5
Purinergic receptor P2Y, 11	P2RY11	5
Purinergic receptor P2Y, 2	P2RY2	5
Pyrroline-5-carboxylate synthetase	PYCS	1
Pyruvate carboxylase	PC	1
Pyruvate decarboxylase	PDHA	1
Pyruvate kinase	PKLR	1
RAD51, DNA repair protein	RAD51	6
RAD52, DNA repair protein	RAD52	6
RAD54, DNA repair protein	RAD54	6
RAD55, DNA repair protein	RAD55	6
RAD57, DNA repair protein	RAD57	6
Ras-G-protein	RAS	6
Rathke pouch homeobox, RPX	RPX	6
Receptor tyrosine kinase (RTK), Nsk2	NSK2	6
Recombination activating gene 1	RAG1	6
Recombination activating gene 2	RAG2	6
Red cone pigment	RCP	3
Relaxin H1	RLN1	6
Relaxin H2	RLN2	6
Replication factor A		1
Replication factor C	RFC2	1
Retinal pigment epithelium specific protein (65kD)	RPE65	3
Retinitis pigmentosa gene 1	RP1	3
Retinitis pigmentosa gene 2	RP2	3
Retinitis pigmentosa gene 3	RP3	3
Retinitis pigmentosa gene 6	RP6	3
Retinitis pigmentosa gene 7	RP7, RDS	3
Retinoblastoma 1	RB1	6
Retinoic acid receptor, alpha	RARA	6
Retinoic acid receptor, beta	RARB	6
Retinoic acid receptor, gamma	RARG	6
Retinoid X receptor, alpha	RXRA	6
Retinoid X receptor, beta	RXRB	6
Retinoid X receptor, gamma	RXRG	6
Retinoschisis, X-linked, juvenile	RS	6
Rhabdoid tumors	SMARCB1	6
Rhodopsin	RHO	3
Ribonucleotide reductase, RRM		1
Ribosomal protein L13A	RPL13A	6
Ribosomal protein L17	RPL17	6
Ribosomal protein S19	RPS19	1
Ribosomal protein S4, X-linked	RPS4X	1
Ribosomal protein S6 kinase	RPS6KA3	1

Ribosomal protein S9	RPS9	6
RIGUI	RIGUI	6
Rod outer segment membrane protein 1	ROM1	3
Ryanodine receptor 1, skeletal	RYR1	6
SA homolog	SAH	6
Sal-like 1	SALL1	6
Secretin	SCT	2
Semaphorin A4	SEMA4	3
Semaphorin A5	SEMA5	3
Semaphorin D		3
Semaphorin E	SEMAE	3
Semaphorin F	SEMA3/F	3
Semaphorin W	SEMAW	3
Serine/threonine kinase 11	STK11	6
Serine/threonine kinase 2	STK2	6
Serotonin N-acetyltransferase	SNAT	1
Serotonin receptor, 5HT1A	HTR1A	5
Serotonin receptor, 5HT1B	HTR1B	5
Serotonin receptor, 5HT1C	HTR1C	5
Serotonin receptor, 5HT1D	HTR1D	5
Serotonin receptor, 5HT1E	HTR1E	5
Serotonin receptor, 5HT1F	HTR1F	5
Serotonin receptor, 5HT2A	HTR2A	5
Serotonin receptor, 5HT2B	HTR2B	5
Serotonin receptor, 5HT2C	HTR2C	5
Serotonin receptor, 5HT3	HTR3	5
Serotonin receptor, 5HT4	HTR4	5
Serotonin receptor, 5HT5	HTR5	5
Serotonin receptor, 5HT6	HTR6	5
Serotonin receptor, 5HT7	HTR7	5
Serum amyloid A	SAA	2
Serum amyloid P	SAP	2
Sex determining region Y, SRY	SRY	6
Short stature homeobox	SHOX	6
Sialoprotein, bone	BSP	6
Signal transducer and activator of transcription 1	STAT1	6
Signal transducer and activator of transcription 2	STAT2	6
Signal transducer and activator of transcription 3	STAT3	6
Signal transducer and activator of transcription 4	STAT4	6
Signal transducer and activator of transcription 5	STAT5	6
Signaling lymphocyte activation molecule	SLAM	4
Sine oculis homeobox, drosophila, homolog 1	SIX1	6

Sine oculis homeobox, drosophila, homolog 2	SIX2	6
Sine oculis homeobox, drosophila, homolog 5	SIX5	6
Sjogren (Sjogren) syndrome antigen A1	SSAL	4
Slug protein		6
Small nuclear ribonucleoprotein polypeptide N	SNRPN	3
Smoothelin	SMTN	6
Smoothened (Drosophila) homolog	SMOH	6
Sodium channel, non-voltage gated 1, alpha	SCNN1A	5
Sodium channel, non-voltage gated 1, beta	SCNN1B	5
Sodium channel, non-voltage gated 1, gamma	SCNN1G	5
Sodium channel, voltage gated, type IV, alpha polypeptide	SCN4A	5
Sodium channel, voltage gated, type V, alpha polypeptide	SCN5A	5
Sodium channel, voltage-gated, type 1, beta polypeptide	SCN1B	5
Solute carrier family 1 (amino acid transporter), member 6	SLC1A6	2
Solute carrier family 1 (glial high affinity glutamate transporter), member 3	SLC1A3	2
Solute carrier family 1 (glutamate transporter), member 1	SLC1A1	2
Solute carrier family 1 (glutamate transporter), member 2	SLC1A2	2
Solute carrier family 1 (neutral amino acid transporter), member 4	SLC1A4	2
Solute carrier family 10 (sodium/bile acid cotransporter family), member 1	SLC10A1	2
Solute carrier family 10 (sodium/bile acid cotransporter family), member 2	SLC10A2	2
Solute carrier family 12, member 1	SLC12A1	2
Solute carrier family 12, member 2	SLC12A2	2
Solute carrier family 12, member 3	SLC12A3	2
Solute carrier family 14, member 2	SLC14A2	2
Solute carrier family 15 (H <sup>+</sup> /peptide transporter, intestinal), member 1	SLC15A1	2
Solute carrier family 15 (H <sup>+</sup> /peptide transporter, kidney), member 2	SLC15A2	2
Solute carrier family 16 (monocarboxylate transporter), member 1	SLC16A1	2
Solute carrier family 16 (monocarboxylate transporter), member 7	SLC16A7	2
Solute carrier family 17, member 1	SLC17A1	2
Solute carrier family 17, member 2	SLC17A2	2
Solute carrier family 18, member 3	SLC18A3	2
Solute carrier family 19 (folate transporter), member 1	SLC19A1	2

Solute carrier family 2 (facilitated glucose transporter), member 1	SLC2A1	2
Solute carrier family 2 (facilitated glucose transporter), member 2	SLC2A2	2
Solute carrier family 2 (facilitated glucose transporter), member 3	SLC2A3	2
Solute carrier family 2 (facilitated glucose transporter), member 4	SLC2A4	2
Solute carrier family 2 (facilitated glucose transporter), member 5	SLC2A5	2
Solute carrier family 20, member 1	SLC20A1	2
Solute carrier family 20, member 2	SLC20A2	2
Solute carrier family 20, member 3	SLC20A3	2
Solute carrier family 21, member 2	SLC21A2	2
Solute carrier family 21, member 3	SLC21A3	2
Solute carrier family 22, member 1	SLC22A1	2
Solute carrier family 22, member 2	SLC22A2	2
Solute carrier family 22, member 5	SLC22A5	2
Solute carrier family 25, member 12	SLC25A12	2
Solute carrier family 3 (facilitated glucose transporter), member 1	SLC3A1	2
Solute carrier family 4 (anion exchanger), member 1	SLC4A1	2
Solute carrier family 4 (anion exchanger), member 2	SLC4A2	2
Solute carrier family 4 (anion exchanger), member 3	SLC4A3	2
Solute carrier family 5 (sodium/glucose transporter), member 1	SLC5A1	2
Solute carrier family 5 (sodium/glucose transporter), member 2	SLC5A2	2
Solute carrier family 5 (sodium/glucose transporter), member 5	SLC5A5	2
Solute carrier family 5, member 3	SLC5A3	2
Solute carrier family 6 (GAMMA-AMINO BUTYRIC ACID transporter), member 1	SLC6A1	2
Solute carrier family 6 (neurotransmitter transporter, dopamine), member 3	SLC6A3	2
Solute carrier family 6 (neurotransmitter transporter, noradrenaline), member 2	SLC6A2	2
Solute carrier family 6 (neurotransmitter transporter, serotonin), member 4	SLC6A4	2
Solute carrier family 6, member 10	SLC6A10	2
Solute carrier family 6, member 6	SLC6A6	2
Solute carrier family 6, member 8	SLC6A8	2
Solute carrier family 7 (amino acid transporter), member 1	SLC7A1	2

Solute carrier family 7(amino acid transporter), member 2	SLC7A2	2
Solute carrier family 7(amino acid transporter), member 7	SLC7A7	2
Solute carrier family 8 (sodium/calcium exchanger), member 1	SLC8A1	2
Somatostatin receptor, SSTR2	SSTR2	6
Somatotrophin		6
Sonic hedgehog, SHH	SHH	6
Sorbitol dehydrogenase	SORD	1
Sorcin	SRI	2
SOSI guanine nucleotide exchange factor	SOS1	6
Spastic paraplegia 7	SPG7	6
Spectrin alpha	SPTAL	3
Spectrin beta	SPTB	3
Sperm adhesion molecule	SPAMI	6
Sperm prolamine P1	PRM1	6
Sperm prolamine P2	PRM2	6
Sphingomyelinase	SMPDI	1
Spinocerebellar ataxia 8 gene	SCA8	5
Split hand/foot malformation gene	DSS1	6
SRY-box 10	SOX10	6
SRY-box 11	SOX11	6
SRY-box 3	SOX3	6
SRY-box 4	SOX4	6
SRY-box 9	SOX9	6
Stem cell factor	SCF	6
Steroid 5 alpha reductase 1	SRD5A1	1
Steroid 5 alpha reductase 2	SRD5A2	1
Steroid hormone receptor responsive DNA elements		6
Steroid sulphatase	STS	1
Steroidogenic acute regulatory protein	STAR	2
Stromal derived factor 1	SDF1	6
Succinate dehydrogenase 1	SDH1	1
Succinate dehydrogenase 2	SDH2	1
Succinate thiokinase		1
Succinic semi-aldehyde dehydrogenase	SSADH	1
Suffamidase	SGSH	6
Sulfite oxidase	SUOX	1
Sulfonylurea receptor	SUR	6
Suppression of tumorigenicity 3 gene	ST3	6
Suppression of tumorigenicity 8 gene	ST8	6
Surfactant pulmonary-associated protein A1	SFTPA1	2
Surfactant pulmonary-associated protein A2	SFTPA2	2
Surfactant pulmonary-associated protein B	SFTPB	2
Surfactant pulmonary-associated protein C	SFTPC	2

Surfactant pulmonary-associated protein D	SFTPD	2
Surfeit 1	SURF1	6
Survival of motor neuron 1, telomeric	SMN1	2
SYK-related tyrosine kinase	SRK	4
Syndecan 1	SYND1	6
Syndecan 2	SYND2	6
Syndecan 3	SYND3	6
Syndecan 4	SYND4	6
Synovial sarcoma gene 1	SSX1	6
Synovial sarcoma gene 2	SSX2	6
Talin	TLN	6
TATA binding protein	TBP	6
TATA binding protein associated factor 2A	TAF2A	6
TATA binding protein associated factor 2C2	TAF2C2	6
TATA binding protein associated factor 2D	TAF2E	6
TATA binding protein associated factor 2F	TAF2F	6
TATA binding protein associated factor 2H	TAF2H	6
TATA binding protein associated factor 2I	TAF2I	6
TATA binding protein associated factor 2J	TAF2J	6
TATA binding protein associated factor 2K	TAF2K	6
Tau protein	MAPT	3
T-BOX 1	TBX1	6
T-BOX 2	TBX2	6
T-BOX 3	TBX3	6
T-BOX 4	TBX4	6
T-BOX 5	TBX5	6
T-BOX 6	TBX6	6
T-cell acute lymphocytic leukemia 1	TAL1	4
T-cell acute lymphocytic leukemia 2	TAL2	4
T-cell receptor, alpha	TCRA	4
T-cell receptor, delta	TCRD	4
Telomerase protein component		1
Tenascin (cytotactin)		3
Tenascin XA	TNXA	3
Terminal deoxynucleotidyltransferase, TDT		1
Testis-specific protein Y	TSPY	6
Thiolase, peroxisomal		1
Thiopurine S-methyltransferase	TPMT	1
Thrombopoietin	THPO	6
Thrombospondin	THBS1	6
Thromboxane A synthase 1	TBXAS1	4
Thromboxane A2	TXA2	4
Thromboxane A2 receptor	TBXA2R	4
Thy-1 T-cell antigen	THY1	4
Thymidylate synthase	TYMS	1
Thymopoietin	TMPO	6
Thyroglobulin	TG	6



Thyroid hormone receptor, alpha	THRA	6
Thyroid hormone receptor, beta	THRB	6
Thyroid peroxidase	TPO	6
Thyroid receptor auxiliary protein	TRAP	6
Thyroid-stimulating hormone receptor	TSHR	6
Thyroid-stimulating hormone, alpha	TSHA	6
Thyroid-stimulating hormone, beta	TSHB	6
Thyrotroph embryonic factor	TEF	6
Thyrotropin releasing hormone	TRH	6
Thyrotropin releasing hormone receptor	TRHR	6
Thyroxin-binding globulin	TBG	2
TIE receptor tyrosine kinase	TIE-1	6
Tip-associated protein	TAP	4
Tissue inhibitor of metalloproteinase 1, TIMP1	TIMP1	1
Tissue inhibitor of metalloproteinase 2, TIMP2	TIMP2	1
Tissue inhibitor of metalloproteinase 3, TIMP3	TIMP3	1
Tissue inhibitor of metalloproteinase 4, TIMP4	TIMP4	1
Tissue non-specific alkaline phosphatase		1
TNSAP		
Titin	TTN	3
Tocopherol (alpha) transfer protein	TTPA	2
Toll-like receptor 4	TLR4	4
Topoisomerase I		1
Topoisomerase II		1
Torticollis, keloids, cryptorchidism and renal dysplasia gene	TKCR	6
Transacylase		1
Transcobalamin 1, TCN1		2
Transcobalamin 2, TCN2	TCN2	2
Transcription factor 1, hepatic	TCF1	6
Transcription factor 2, hepatic	TCF2	6
Transcription factor 3	TCF3	6
Transcription factor binding to IGHM enhancer 3	TFE3	6
Transcription factor, TUPLE1	TUPLE1	5
Transcription termination factor, RNA polymerase 1	TTF1	6
Transcription termination factor, RNA polymerase 2	TTF2	6
Transcription termination factor, RNA polymerase 3	TTF3	6
Transferrin	TF	6
Transferrin receptor	TFRC	6
Transforming growth factor, alpha	TGFA	6
Transforming growth factor, beta 2	TGFB2	6
Transforming growth factor, beta induced	TGFB1	6
Transforming growth factor, beta receptor 2	TGFR2	6

Transglutaminase 1	TGMI	6
Transglutaminase 2	TGM2	6
Transglutaminase 4	TGM4	6
Transketolase	TKT	1
Transketolase-like 1	TKTL1	1
Translocation in renal carcinoma on chromosome 8 gene	TRC8	6
Transthyretin	TTR	2
Treacle gene	TCOF1	6
Triosephosphate isomerase	TPI 1	1
Tropomyosin 1 alpha	TPM1	3
Tropomyosin 3 (non-muscle)	TPM3	3
Troponin C		3
Troponin I	TNNI3	3
Troponin T2, cardiac	TNNT2	3
Trypsin inhibitor		1
Trypsinogen 1	TRY1	1
Trypsinogen 2	TRY2	1
Tryptophan hydroxylase	TPH	1
Tubby-like protein 1	TULP1	6
Tuberous sclerosis 1	TSC1	6
Tuberous sclerosis 2	TSC2	6
Tubulin		3
Tumour necrosis factor (TNF) receptor associated factor 1	TRAF1	4
Tumour necrosis factor (TNF) receptor associated factor 2	TRAF2	4
Tumour necrosis factor (TNF) receptor associated factor 3	TRAF3	4
Tumour necrosis factor (TNF) receptor associated factor 4	TRAF4	4
Tumour necrosis factor (TNF) receptor associated factor 5	TRAF5	4
Tumour necrosis factor (TNF) receptor associated factor 6	TRAF6	4
Tumour necrosis factor alpha	TNFA	4
Tumour necrosis factor alpha receptor	TNFAR	4
Tumour necrosis factor beta	TNFB	4
Tumour necrosis factor beta receptor	TNFBR	4
Tumour protein p53	TP53,P53	6
Tumour protein p63	TP63	6
Tumour protein p73	TP73	6
Tumour protein, transiationally-controlled 1	TPT1	6
Tumour suppressor gene DRA	DRA	4
Twist (Drosophila) homolog	TWIST	6
Tyrosinase	TYR	1
Tyrosinase-related protein 1	TYRP1	1

Tyrosine aminotransferase	TAT	1
Tyrosine hydroxylase	TH	1
Ubiquitin		6
Ubiquitin activating enzyme, E1		1
Ubiquitin B	UBB	6
Ubiquitin C	UBC	6
Ubiquitin carboxyl-terminal esterase L1	UCHL1	6
Ubiquitin fusion degeneration I-like	UFD1L	6
Ubiquitin protein ligase E3A	UBE3A	1
UDP-glucose pyrophosphorylase		1
UDP-glucuronosyltransferase 1	ugt1d, UGT1	1
UDP-glucuronosyltransferase 2	UGT2	1
Uncoupling protein 1		2
Uncoupling protein 3	UCP3	2
Undulin 1	COL14A1	3
Uridine monophosphate kinase	UMPK	4
Uridine monophosphate synthetase	UMPS	4
Uridinediphosphate(UDP)-galactose-4-epimerase	GALE	1
Uroporphyrinogen decarboxylase	UROD	1
Uroporphyrinogen III synthase	UROS	1
Usher syndrome 2A	USH2A	3
Vascular endothelial growth factor	VEGF	6
Vasoinhibitory peptide		6
Vitamin B12-binding (R) protein		6
Vitamin D receptor	VDR	6
Vitelliform macular dystrophy, atypical gene	VMD1	2
v-myc avian myelocytomatosis viral oncogene homolog	MYC	6
Von Hippel-Lindau gene	VHL	6
Werner syndrome helicase	WRN	6
Wilms tumour gene 1	WT1	6
Wilms tumour gene 2	WT2	6
Wilms tumour gene 4	WT4	6
Winged helix nude	WHN	6
Wingless family, wnt2	WNT2	6
Wingless family, wnt4	WNT4	6
Wingless family, wnt5	WNT5	6
Wingless family, wnt7	WNT7	6
Wingless family, wnt8	WNT8	6
Wiskott-Aldrich syndrome protein	WASP, THC	4
Wnt inhibitory factor, WIF-1	WIF1	6
Wolf-Hirschhorn syndrome candidate 1 gene	WHSC1	6
Wolfram syndrome 1 gene	WFS1	3
X (inactive)-specific transcript	XIST	6
Xanthine dehydrogenase	XDH	1

Xeroderma pigmentosum, complementation group A	XPA	1
Xeroderma pigmentosum, complementation group B	XPB	1
Xeroderma pigmentosum, complementation group C	XPC	1
Xeroderma pigmentosum, complementation group D		1
Xeroderma pigmentosum, complementation group E		1
Xeroderma pigmentosum, complementation group F	XPF	1
Xeroderma pigmentosum, complementation group G	ERCC5	1
X-ray repair gene	XRCC9	6
Xylitol dehydrogenase		6
YY1 transcription factor	YY1	6
Zinc finger protein 2	ZIC2	3
Zinc finger protein 3	ZIC3	3
Zinc finger protein HRX	ALL1	4
Zona pellucida glycoprotein 1	ZP1	6
Zona pellucida glycoprotein 2	ZP2	6
Zona pellucida glycoprotein 3	ZP3	6
Zona pellucida receptor tyrosine kinase	ZRK	6
Zonadhesin	ZAN	6

Legende für die Spalte Proteinfunktion:

1	Enzym	2	Transport und Lagerung
3	Struktur	4	Immunität
5	Nervale Transmission	6	Wachstum und Differenzierung

**Tabelle 13****Fehlfunktion, Schädigung oder Erkrankung der Haut, der Muskeln, des Bindegewebes oder der Knochen**

<b>Liste der Gene</b>	<b>HUGO Gensymbol</b>	<b>Protein- funktion</b>
17beta Hydroxysteroid oxidoreductase		1
5,10-methylenetetrahydrofolate reductase (NADPH)	MTHFR	1
6-Phosphofructo-2-kinase	PFKFB1	1
Acetoacetyl 2-CoA-thiolase	ACAT2	1
Acetylcholine receptor, nicotinic, alpha A1	CHRNA1	5
Acetylcholine receptor, nicotinic, alpha A2	CHRNA2	5
Acetylcholine receptor, nicotinic, alpha A3	CHRNA3	5
Acetylcholine receptor, nicotinic, alpha A4	CHRNA4	5
Acetylcholine receptor, nicotinic, alpha A5	CHRNA5	5
Acetylcholine receptor, nicotinic, alpha A6	CHRNA6	5
Acetylcholine receptor, nicotinic, alpha A7	CHRNA7	5
Acetylcholine receptor, nicotinic, beta 1	CHRNB1	5
Acetylcholine receptor, nicotinic, beta 2	CHRNB2	5
Acetylcholine receptor, nicotinic, beta 3	CHRNB3	5
Acetylcholine receptor, nicotinic, beta 4	CHRNB4	5
Acetylcholine receptor, nicotinic, epsilon	CHRNE	5
Acetylcholine receptor, nicotinic, gamma	CHRNG	5
Acetylcholinesterase	ACHE	1
Achromatopsia 2	ACHM2	3
Acid phosphatase 2, lysosomal	ACP2	1
Actin, alpha, cardiac	ACTC	3
Actin, alpha, skeletal	ACTA1	3
Actin, alpha, smooth, aortic	ACTA2	3
Actin, beta	ACTB	3
Actin, gamma 2	ACTG2	3
Activin		6
Acyl CoA dehydrogenase, short chain	ACADS	1
Acyl-CoA thioesterase		1
Adaptin, beta 3A	ADTB3A	2
Adducin, alpha	ADD1	3
Adducin, beta	ADD2	3
Adenosine deaminase	ADA	1
Adenosine monophosphate deaminase	AMPD	1
Adenosine receptor A1	ADORA1	5
Adenosine receptor A2A	ADORA2A	5
Adenosine receptor A2B	ADORA2B	5
Adenosine receptor A3	ADORA3	5
Adenyl cyclase		5
Adenylate cyclase 1	ADCY1	1

Adenylate cyclase 2	ADCY2	1
Adenylate cyclase 3	ADCY3	1
Adenylate cyclase 4	ADCY4	1
Adenylate cyclase 5	ADCY5	1
Adenylate cyclase 6	AOCY6	1
Adenylate cyclase 7	ADCY7	1
Adenylate cyclase 8	ADCY8	1
Adenylate cyclase 9	ADCY9	1
Adenylate kinase	AK1	1
Adenylosuccinate lyase	ADSL	1
Adrenergic receptor, alphas	ADRA1	5
Adrenergic receptor, alpha2	ADRA2	5
Adrenergic receptor, beta1	ADRB1	5
Adrenergic receptor, beta2	ADRB2	5
Adrenergic receptor, beta3	ADRB3	5
Adrenocorticotrophic hormone (ACTH) receptor	ACTHR	6
Adrenoleukodystrophy gene	ALD	1
Alanine aminotransferase		2
Alanine-glyoxylate aminotransferase	AGXT	1
Albumin, ALB	ALB	2
Alcohol dehydrogenase 1	ADH1	1
Alcohol dehydrogenase 2	ADH2	1
Alcohol dehydrogenase 3	ADH3	1
Alcohol dehydrogenase 4	ADH4	1
Alcohol dehydrogenase 5	ADH5	1
Alcohol dehydrogenase 6	ADH6	1
Alcohol dehydrogenase 7	ADH7	1
Aldehyde dehydrogenase 1	ALDH1	1
Aldehyde dehydrogenase 10	ALDH10	1
Aldehyde dehydrogenase 2	ALDH2	1
Aldehyde dehydrogenase 5	ALDH5	1
Aldehyde dehydrogenase 6	ALDH6	1
Aldehyde dehydrogenase 7	ALDH7	1
Aldolase A	ALDOA	1
Aldolase B	ALDOB	1
Aldolase C	ALDOC	1
Aldosterone receptor	MLR	6
Alkaline phosphatase, liver/bone/kidney	ALPL	2
Alkaptonuria gene	AKU	6
Alkylglycerone phosphate synthase	AGPS	1
alpha tectorin	TECTA	6
alpha thalassemia gene	ATRX	5
alpha 1-antichymotrypsin	AACT	1
alpha1-antitrypsin	PI	1
alpha2-antiplasmin	PLI	1
alpha-actinin 2	ACTN2	6

alpha-actinin 3	ACTN3	6
alpha-Galactosidase A	GLA	1
Alpha-galactosidase B, GALB	NAGA	1
alpha-synuclein	SNCA	5
Amelogenin	AMELX	3
Aminopeptidase P	XPNPEP2	1
Amphiregulin	AREG	6
Amylo-1,6-glucosidase	AGL	1
Amyloid beta A4 precursor protein	APP	5
Amyloid beta A4 precursor-like protein	APLP	5
Androgen binding protein	ABP	2
Androgen receptor	AR	6
Angiopoietin 1	ANGPT1	6
Angiopoietin 2	ANGPT2	6
Angiotensin converting enzyme	ACE,DCPI	1
Angiotensinogen	AGT	1
Antidiuretic hormone receptor	ADHR	2
Anti-Mulledan hormone	AMH	6
Apolipoprotein A 4	APOA4	2
Apolipoprotein A I	APOA1	2
Apolipoprotein A II	APOA2	2
Apolipoprotein B	APOB	2
Apolipoprotein C1	APOC1	2
Apolipoprotein C2	APOC2	2
Apolipoprotein C3	APOC3	2
Apolipoprotein D	APOD	2
Apolipoprotein E	APOE	2
Apolipoprotein H	APOH	2
Arginine vasopressin	AVP	5
Arginine vasopressin receptor 1A	AVPR1A	5
Arginine vasopressin receptor 1B	AVPR1B	5
Arginine vasopressin receptor 2	AVPR2	5
Arrestin	SAG	3
Aryl hydrocarbon receptor nuclear translocator	ARNT	2
Arylsulfatase A	ARSA	1
Arylsulfatase B	ARSB	1
Arylsulfatase C	ARSCI	1
Arylsulfatase D	ARSD	1
Arylsulfatase E	ARSE	1
Arylsulfatase F	ARSF	1
Aspartate receptor		5
Aspartoacylase	ASPA	1
Aspartylglucosaminidase	AGA	1
Ataxia telangiectasia complementation group D	ATD,ATDC	6
Ataxia telangiectasia gene, AT	ATM	6

ATP cobalamin adenosyltransferase		1
ATP sulphurylase	atpsk2	1
ATP/ADP translocase		1
Afractin		4
Autoimmune regulator, AIRE	AIRE	4
BCL2-related protein A1	BCL2A1	6
Benzodiazepine receptor		5
Bestrophin	VMD2	2
beta 2 Microglobulin	B2M	4
beta-endorphin receptor		5
beta-galactosidase	GLBI	1
beta-Glucuronidase	GUSB	1
beta-synuclein	SNCB	5
Bilirubin UDP-glucuronosyltransferase		1
Bloom syndrome protein	BLM	6
Blue cone pigment	BCP	3
Bone morphogenetic protein, BMP1	BMP1	6
Bone morphogenetic protein, BMP2	BMP2	6
Bone morphogenetic protein, BMP3	BMP3	6
Bone morphogenetic protein, BMP4	BMP4	6
Bone morphogenetic protein, BMP5	BMP5	6
Bone morphogenetic protein, BMP6	BMP6	6
Bone morphogenetic protein, BMP7	BMP7	6
Bone morphogenetic protein, BMP8	BMP8	6
Bradykinin receptor B1		4
Bradykinin receptor B2		4
Branched chain aminotransferase 1, cytosolic	BCAT1	1
Branched chain aminotransferase 2, mitochondrial	BCAT2	1
Breast cancer, ductal, 1	BRCD1	6
Breast cancer, ductal, 2	BRCD2	6
Butyrylcholinesterase	BCHE	1
Ca(2+) transporting ATPase, fast twitch	ATP2A1	2
Ca(2+) transporting ATPase, slow twitch	ATP2A2	2
Cadherin E	CDH1	6
Cadherin EP		6
Cadherin N	CDH2	6
Cadherin P	CDH3	6
Calbindin 1	CALB1	6
Calbindin D9K	CALB3	6
Calcitonin receptor /Calcitonin gene-related peptide receptor	CALCR	5
Calcitonin/Calcitonin gene-related peptide alpha	CALCA	5
Calcium channel, voltage-dependent, L type, alpha 1S subunit	CACNA1S	5



Calcium channel, voltage-dependent, P/Q type, alpha 1A subunit	CACNA1A	5
Calmodulin 1	CALM1	6
Calmodulin 2	CALM2	6
Calmodulin 3	CALM3	6
Calnexin	CANX	6
Calpain	CAPN,CAPN3	1
Cannabinoid receptor	CNR1	5
Carbonic anhydrase 3	CA3	1
Carbonic anhydrase 4	CA4	1
Carbonic anhydrase, alpha	CA1	1
Carbonic anhydrase, beta	CA2	1
Camitine acetyltransferase	CRAT	1
Camitine acylcarnitine translocase	CACT	1
Carnitine palmitoyltransferase I	CPT1A	1
Carnitine paimitoyltransferase II	CPT2	1
Camitine transporter protein	CDSP,SCD	2
Cartilage oligomeric matrix protein	COMP, EDM1,	5
PSACH		
Cartilage-hair hypoplasia gene	CHH	5
Catenin, beta	CTNNB1	6
Cathepsin K	CTSK	1
Caveolin 3	CAV3	1
CD1	CD1	
C04	CD4	
Ceroid lipofuscinosis neuronal 3	CLN3	5
Ce loplasmin precursor	CP	1
Chemokine MCAF	MCAF	4
Chloride channel 1, skeletal muscle	CLCN1	3
Cholecystokinin	CCK	5
Cholecystokinin B receptor	CCKBR	5
Cholesterol ester hydroxylase		1
Choline acetyltransferase	CHAT	1
Choroideremia gene	CHM	3
Citrate synthase		1
Clathdn		2
Cleft palate gene	CPX	6
Cockayne syndrome gene, CKN1	CKN1	6
Coenzyme Q (CoQ)/ubiquinone		1
Collagen I alpha 1	COL1A1	3
Collagen I alpha 2	COL1A2	3
Collagen II alpha 1	COL2A1	3
Collagen III alpha 1	COL3A1	3
Collagen IV alpha 1	COL4A1	3
Collagen IV alpha 2	COL4A2	3
Collagen IV alpha 3	COL4A3	3
Collagen IV alpha 4	COL4A4	3

Co lagen IV alpha 5	COL4A5	3
Collagen IV alpha 6	COL4A6	3
Collagen IX alpha 2	COL9A2, EDM2	3
Collagen IX alpha 3	COL9A3	3
Collagen receptor	COLR	3
Collagen V alpha 1	COL5A1	3
Collagen V alpha 2	COL5A2	3
Collagen VI alpha 1	COL6A1	3
Collagen VI alpha 2	COL6A2	3
Collagen VI alpha 3	COL6A3	3
Collagen VII alpha 1	COL7A1	3
Collagen X alpha 1	COL10A1	3
Collagen X alpha 1	COLL11A1	3
Collagen XI alpha 2	COLL11A2	3
Collagen XVI I alpha 1	COL17A1	3
Collagenic-like tail subunit of asymmetric acetylcholinesterase	COLQ	1
Collapsin		6
Colony-stimulating factor 1	CSF1	6
Colony-stimulating factor 1 receptor	CSF1R	6
Colony-stimulating factor 2	CSF2	6
Colony-stimulating factor 2 alpha receptor	CSF2RA	6
Colony-stimulating factor 2 beta receptor	CSF2RB	6
Colony-stimulating factor 3	CSF3	6
Colony-stimulating factor 3 receptor	CSF3R	6
Complement component C1 inhibitor	C1NH	4
Complement component C1QA	C1QA	4
Complement component C1QB	C1QB	4
Complement component C1QG	C1QG	4
Complement component C1r	C1R	4
Complement component C1s	C1S	4
Complement component C2	C2	4
Complement component C3	C3	4
Complement component C4A	C4A	4
Complement component C4B	C4B	4
Complement component C5	C5	4
Complement component C6	C6	4
Complement component C7	C7	4
Complement component C8	C8B	4
Complement component C9	C9	4
Complement component receptor 1	CR1	4
Complement component receptor 2	CR2	4
Complement component receptor 3	CR3	4
Complex		1
Complex II		1
Complex III		1
Complex III		1

Complex V	MTATP6	1
Cone-rod homeobox-containing gene	CRX	6
Coproporphyrinogen oxidase	CPO	1
Core-binding factor, alpha 1	CBFAL	6
Core-binding factor, alpha 2	CBFA2	6
Core-binding factor, beta	CBFB	6
Corticosteroid binding globulin	CBG	5
Corticosteroid binding protein		2
Corticotrophin-releasing hormone	CRH	2
Corticotrophin-releasing hormone receptor	CRHR1	2
Cortisol receptor		4
C-reactive protein CRP		4
Creatine kinase - B and m	CKBE	1
Creb binding protein	CREBBP	6
Crystallin, alpha A	CRYAA	3
Crystallin, alpha B	CRYAB	3
Crystallin, beta B2	CRYBB2	3
Crystallin, gamma A	CRYGA	3
c-src tyrosine kinase	CSK	6
Cu <sup>2+</sup> transporting ATPase alpha polypeptide	ATP7A	1
Cu <sup>2+</sup> transporting ATPase beta polypeptide	ATP7B	1
Cyclic AMP response element binding protein CREB		6
Cyclic AMP-dependent protein kinase	PKA	1
Cyclic nucleotide phosphodiesterase 1B	PDE1B	1
Cyclic nucleotide phosphodiesterase 1B1	PDE1B1	1
Cyclic nucleotide phosphodiesterase 2A3	PDE2A3	1
Cyclic nucleotide phosphodiesterase 3A	PDE3A	1
Cyclic nucleotide phosphodiesterase 3B	PDE3B	1
Cyclic nucleotide phosphodiesterase 4A	PDE4A	1
Cyclic nucleotide phosphodiesterase 4C	PDE4C	1
Cyclic nucleotide phosphodiesterase 5A	PDE5A	1
Cyclic nucleotide phosphodiesterase 6A	PDE6A	1
Cyclic nucleotide phosphodiesterase 6B	PDE6B	1
Cyclic nucleotide phosphodiesterase 7	PDE7	1
Cyclic nucleotide phosphodiesterase 8	PDE8	1
Cyclic nucleotide phosphodiesterase 9A	PDE9A	1
Cyclin-dependent kinase 2	CDK2	6
Cyclin-dependent kinase inhibitor IC (P57, KIP2)	CDKN1C	6
Cyclin-dependent kinase inhibitor 2A (p16)	CDKN2A	6
Cyclooxygenase 1	COX1	1
Cyclooxygenase 2	COX2	1
CYP11A1	CYP11A1	1
CYP11B1	CYP11B1	1
CYP11B2	CYP11B2	1
CYP17	CYP17	1
CYP19	CYP19	1

CYP1A1	CYP1A1	1
CYP1A2	CYP1A2	1
CYP1B1	CYP1B1	1
CYP21	CYP21	1
CYP24	CYP24	1
CYP27	CYP27	1
CYP27B1	PDDR	1
CYP2A1	CYP2A1	1
CYP2A13	CYP2A13	1
CYP2A3	CYP2A3	1
CYP2A6V2	CYP2A6V2	1
CYP2A7	CYP2A7	1
CYP2B6	CYP2B6	1
CYP2C18	CYP2C18	1
CYP2C19	CYP2C19	1
CYP2C8	CYP2C8	1
CYP2C9	CYP2C9	1
CYP2D6	CYP2D6	1
CYP2E1	CYP2E1	1
CYP2F1	CYP2F1	1
CYP2J2	CYP2J2	1
CYP3A3	CYP3A3	1
CYP3A4	CYP3A4	1
CYP3A5	CYP3A5	1
CYP3A7	CYP3A7	1
CYP4A11	CYP4A11	1
CYP4B1	CYP4B1	1
CYP4F2	CYP4F2	1
CYP4F3	CYP4F3	1
CYP51	CYP51	1
CYP5A1	CYP5A1	1
CYP7A	CYP7A	1
CYP8	CYP8	1
Cystathionase	CTH	1
Cystathione beta synthase	CBS	1
Cystic fibrosis transmembrane conductance regulator, CFTR	CFTR	5
Cystinosin	CTNS	2
Cytidine deaminase	CDA	1
Cytidine-5-prime-triphosphate synthetase	CTPS	1
Cytochrome a		1
Cytochrome b-5	CYB5	1
Cytochrome c		1
Cytochrome c oxidase, MTCO		1
Cytokine-suppressive antiinflammatory drug- binding protein 1	CSBP1	4

Cytokine-suppressive antiinflammatory drug-binding protein 2	CSBP2	4
DAX1 nuclear receptor	DAX1	4
Deafness dystonia peptide	DDP	5
Delta-4,5-alpha-reductase		1
Delta aminolevulinate dehydratase	ALAD	1
Delta(4)-3-oxosteroid 5-beta-reductase		1
Delta-7-dehydrocholesterol reductase	DHCR7	1
Dentin sialophosphoprotein	DSPP	6
Desmin	DES	3
DHEA sulfotransferase	STD	1
Diastrophic dysplasia sulfate transporter	DTD	2
Dihydrolipoamide dehydrogenase	DLD	5
Dihydroxyacetonephosphate acyltransferase	DHAPAT	1
DNA damage binding protein, DDB1	DDB1	3
DNA damage binding protein, DDB2	DDB2	3
DNA methyltransferase	DNMT	1
DNA-damage-inducible transcript 3	DDIT3	3
Dopamine receptors D1	DRD1	5
Dopamine receptors D2	DRD2	5
Dopamine receptors D3	DRD3	5
Dopamine receptors D4	DRD4	5
Dopamine receptors D5	DRD5	5
Dynammin	DNM1	6
Dynorphin receptor		5
Dyskehn	DKC1	3
Dystonia 1	DYT1	3
Dystonia 3	DYT3	3
Dystonia 6	DYT6	3
Dystonia 7	DYT7	3
Dystrophia myotonica	DM, DMPK	1
Dystrophia myotonica, atypical	DM2	1
Dystrophin	DMD	3
Dystrophin-associated glycoprotein 35kD, SCGD	SGCD	3
Dystrophin-associated glycoprotein 35kD, SGSG	SGCG	3
Dystrophin-associated glycoprotein 43kD	SGCB	3
Dystrophin-associated glycoprotein 50kD	SGCA	3
Ectodermal Dysplasia 1 gene	ED1	3
Elastase 1	ELAS1	1
Elastase 2	ELAS2	1
Elastin	ELN	3
Electron-transferring-flavoprotein alpha	ETFA	2
Electron-transferring-flavoprotein beta	ETFB	2
Electron-transferring-flavoprotein dehydrogenase	ETFDH	1

Emerin	EMD	2
Endocardial fibroelastosis 2 gene	EFE2	3
Endometrial bleeding-associated factor	EBAF	6
Endothelin 1	EDN1	5
Endothelin 2	EDN2	5
Endothelin 3	ED 3	5
Endothelin converting enzyme	ECE1	5
Endothelin receptor type A	EDNRA	5
Endothelin receptor type 8	EDNRB	5
Engrailed-1	EN1	6
Engrailed-2	EN2	6
Enolase	ENO1	1
Enoyl CoA hydratase		1
Enoyl CoA isomerase		1
Enoyl CoA reductase		1
Enterokinase	PRSS7, ENTK	1
Ephrin receptor tyrosine kinase A	EPHA	6
Ephrin receptor tyrosine kinase B	EPHB	6
Epidermal growth factor	EGF	6
Epidermal growth factor receptor	EGFR	6
Erythrocyte membrane protein band 4.1	EPB41	3
Erythropoietin	EPO	4
Erythropoietin receptor	EPOR	4
Estrogen receptor	ESR	6
Exostosin 1	EXT1	3
Exostosin 2	EXT2	3
Exostosin 3	EXT3	3
Eye colour gene 3 (brown)	EYCL3	3
Eyes absent 1	EYA1	6
Faciogenital dysplasia	FGDI, FG DY	2
Factor I (No. one)	F1	
Factor B, properdin		
Factor D		
Factor H	HF1	
Factor X	F10	
Fanconi anemia, complementation group A	FANCA	2
Fanconi anemia, complementation group C	FANCC	2
Fanconi anemia, complementation group D FANCD		2
Fc fragment of IgG, high affinity IA, receptor for	FCGR1A	6
Fc fragment of IgG, low affinity IIa, receptor for (CD32)	FCGR2A	6
Ferritin, H subunit		2
Ferritin, L subunit	FTL	2
Fibrillin 1	FBN1	6
Fibrillin 2	FBN2	6
Fibrinogen alpha	FGA	3

Fibrinogen beta	FGB	3
Fibrinogen gamma	FGG	3
Fibroblast growth factor	FGF1	6
Fibroblast growth factor receptor 1	FGFR1	6
Fibroblast growth factor receptor 2	FGFR2	6
Fibroblast growth factor receptor 3	FGFR3	6
Fibronectin precursor	FN1	6
Flightless-II, Drosophila homolog of	FLII	6
Folic acid receptor	FOLR	6
Follicle stimulating hormone receptor	FSHR,ODG1	6
Follicle stimulating hormone, FSH	FSHB	6
Forkhead transcription factor 10	FKHL10	6
Forkhead transcription factor 14	FKHL14	6
Forkhead transcription factor 7	FKHL7	6
Fragile site, folic acid type, rare, fra(X) A	FRAXA	5
Frataxin	FRDA	6
Fringe secreted protein, lunatic	LFNG	6
Fringe secreted protein, manic	MFNG	6
Fringe secreted protein, radical	RFNG	6
Fructose-1,6-diphosphatase	FBP1	1
Fucosidase alpha-L-1	FUCA1	1
Fucosidase alpha-L-2		1
Fukuyama type congenital muscular dystrophy	FCMD	6
Fumarase	FH	1
GABA receptor, alpha 1	GABRA1	5
GABA receptor, alpha 2	GABRA2	5
GABA receptor, alpha 3	GABRA3	5
GABA receptor, alpha 4	GABRA4	5
GABA receptor, alpha 5	GABRA5	5
GABA receptor, alpha 6	GABRA6	5
GABA receptor, beta 1	GABRB1	5
GABA receptor, beta 2	GABRB2	5
GABA receptor, beta 3	GABRB3	5
GABA receptor, gamma 1	GABRG1	5
GABA receptor, gamma 2	GABRG2	5
GABA receptor, gamma 3	GABRG3	5
Galactocerebrosidase	GALC	1
Galactokinase	GALK1	1
Galactose I -phosphate uridyl-transferase	GALT	1
Gamma-glutamyl carboxylase	GGCX	2
Gap junction protein alpha 3	GJA3	2
Gap junction protein alpha 8	GJA8	2
Gap junction protein beta 3	GJB3	2
Gastrulation brain homeobox 2	GBX2	6
Glucosidase, acid alpha	GAA	1
Glucosidase, acid beta	GBA	1

Glutamate receptor 1	GLUR1	5
Glutamate receptor 2	GLUR2	5
Glutamate receptor 3	GLUR3	5
Glutamate receptor 4	GLUR4	5
Glutamate receptor 5	GLUR5	5
Glutamate receptor 6	GLUR6	5
Glutamate receptor 7	GLUR7	5
Glutamate receptor, ionotropic, NMDA 1	NMDAR1	5
Glutamate receptor, ionotropic, NMDA 2A	NMDAR2A	5
Glutamate receptor, ionotropic, NMDA 2B	NMDAR2B	5
Glutamate receptor, ionotropic, NMDA 2C	NMDAR2C	5
Glutamate receptor, ionotropic, NMDA 2D	NMDAR2D	5
Glutathione	GSH	2
Glutathione peroxidase, GPX1	GPX1	1
Glutathione S-transferase, GSTZ1	GSTZ1	1
Glyceraldehyde-3-phosphate dehydrogenase, GAPDH	GAPDH	1
Glycerol kinase	GK	1
Glycinamide ribonucleotide (GAR) transformylase	GART	1
Glycine receptor, alpha	GLRA2	5
Glycine receptor, beta		5
Glycine transporter	GLYT	5
Glycogen phosphorylase	PYGL	1
Glycosyltransferases, ABO blood group	ABO	1
GM2 ganglioside activator protein, GM2A	GM2A	1
Green cone pigment	GCP	3
Growth arrest-specific homeobox	GAX	6
Growth factor receptor-bound protein 2	GRB2	6
Growth hormone 1	GH1	6
Growth hormone 2 (placental)	GH2	6
Growth hormone receptor	GHR	6
Growth hormone releasing hormone (GHRH)	GHRH	6
Growth hormone releasing hormone receptor	GHRHR	6
Growth/differentiation factor 5	GDF5	6
GTP cylcohydrolase 1	GCH1	6
GTPase-activating protein, GAP	RASAL	6
Guanidinoacetate N-methyltransferase	GAMT	1
Guanine nucleotide-binding protein, alpha activating activity polypeptide, GNAO	GNAO1	5
y		
Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 1, GNA[L	GNAI1	5
Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 2, GNA 2	GNAI2	5
Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 3, GNA[3	GNAI3	5



Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS1	GNAS1	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS2	GNAS2	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS3	GNAS3	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS4	GNAS4	5
Guanine nucleotide-binding protein, alpha transducing activity polypeptide, GNAT1	GNAT1	5
Guanine nucleotide-binding protein, alpha transducing activity polypeptide, GNAT2	GNAT2	5
Guanine nucleotide-binding protein, beta polypeptide 3	GNB3	5
Guanine nucleotide-binding protein, gamma polypeptide 5	GNG5	5
Guanine nucleotide-binding protein, q polypeptide	GNAQ	5
Guanylate cyclase 2D, membrane (retina-specific)	GUCY2D	1
Guanylate cyclase activator 1A (retina)	GUCALA	1
H(+), K(+) - ATPase	ATP4B	5
Haeme regulated inhibitor kinase	1	
Haemoglobin alpha I	HBAL	2
Haemoglobin alpha 2	HBA2	2
Haemoglobin beta	HBB	2
Haemoglobin delta	HBD	2
Haemoglobin gamma A	HBG1	2
Haemoglobin gamma B	HBG2	2
Haemoglobin gamma G	HBGG	2
Hairless	HR	6
Heat shock protein, HSP60		4
Heat shock protein, HSP70		4
Heat shock protein, HSP90		4
Heat shock protein, HSPA1		4
Heat shock protein, HSPA2		4
Heparan sulfamidase		1
Heparin binding epidermal growth factor	HBEGF	6
Heparin Cofactor II	HCF2	4
Hepatocyte growth factor	HGF	6
Hermansky-pudlak syndrome gene	HPS	2
Hexokinase 2	HK2	1
Hexosaminidase A	HEXA,TSD	1
Hexosaminidase B	HEXB	1
Histamine receptors, H1		5
Histamine receptors, H2		5
Histamine receptors, H3		5

HLA-B associated transcript 1	BAT1	4
Holocarboxylase synthetase	HLCS	1
Holoprosencephaly 1	HPEI	6
Holoprosencephaly 2	HPE2	6
Holoprosencephaly 3	HPE3	6
Holoprosencephaly 4	HPE4	6
Homeobox (HOX) gene A1	HOXA1	6
Homeobox (HOX) gene A10	HOXA10	6
Homeobox (HOX) gene A11	HOXA11	6
Homeobox (HOX) gene A12	HOXA12	6
Homeobox (HOX) gene A13	HOXA13	6
Homeobox (HOX) gene A2	HOXA2	6
Homeobox (HOX) gene A3	HOXA3	6
Homeobox (HOX) gene A4	HOXA4	6
Homeobox (HOX) gene A5	HOXA5	6
Homeobox (HOX) gene A6	HOXA6	6
Homeobox (HOX) gene A7	HOXA7	6
Homeobox (HOX) gene A8	HOXA8	6
Homeobox (HOX) gene A9	HOXA9	6
Homeobox (HOX) gene B1	HOXBL	6
Homeobox (HOX) gene B2	HOXB2	6
Homeobox (HOX) gene B3	HOXB3	6
Homeobox (HOX) gene B4	HOXB4	6
Homeobox (HOX) gene B5	HOXB5	6
Homeobox (HOX) gene B6	HOXB6	6
Homeobox (HOX) gene B7	HOXB7	6
Homeobox (HOX) gene B8	HOXB8	6
Homeobox (HOX) gene B9	HOXB9	6
Homeobox (HOX) gene C13	HOXC13	6
Homeobox (HOX) gene C4	HOXC4	6
Homeobox (HOX) gene C8	HOXC8	6
Homeobox (HOX) gene C9	HOXC9	6
Homeobox (HOX) gene D1	HOXD1	6
Homeobox (HOX) gene D10	HOXD10	6
Homeobox (HOX) gene D12	HOXD12	6
Homeobox (HOX) gene D13	HOXD13	6
Homeobox (HOX) gene D3	HOXD3	6
Homeobox (HOX) gene D4	HOXD4	6
Homeobox (HOX) gene D8	HOXD8	6
Homeobox (HOX) gene D9	HOXD9	6
Homeobox 11	HOX11	6
Homeobox HB24	HLX1	6
Homeobox HB9	HLXB9	6
Homeobox, PROX1	PROX1	6
Homogentisate 1,2 dioxygenase	HGD	1
Human placental lactogen	CSH1	6
Hypoxia inducible factor 1	HIF1A	1

Hypoxia inducible factor 2		1
IC7 A and B		4
Immunoglobulin E (IgE) responsiveness gene	IGER	4
Indian hedgehog, ihh	IHH	6
Inhibin, alpha	INHA	6
Inhibin, beta A	INHBA	6
Inhibin, beta B	INHBB	6
Inhibin, beta C	INHBC	6
Inositol 1,4,5-triphosphate receptor 3	ITPR3	6
Insulin promotor factor 1	IPF1	6
Insulin-like growth factor 1	IGF1	6
Insulin-like growth factor 1 receptor	IGF	6
Insulin-like growth factor 2	IGF2	6
Insulin-like growth factor 2 receptor	IGF2R	6
Integrin beta 1	ITGBL	6
Integrin beta 3	ITGB3	6
Integrin beta 4	ITGB4	6
Integrin, alpha 5	ITGA5	6
Integrin, alpha 7	ITGA7	6
Inter-alpha-trypsin inhibitor, IAT1		1
Interferon alpha	IFNA1	4
Interferon beta	IFNB	4
Interferon gamma	IFNG	4
Interferon gamma receptor 1	IFNGR1	4
Interferon gamma receptor 2	IFNGR2	4
Interferon regulatory factor 1	IRF1	4
Interferon regulatory factor 4	IRF4	4
Interleukin(IL) 1 receptor	IL1R	4
Interleukin(IL) 1, alpha	IL1A	4
Interleukin(IL) 1, beta	IL1B	4
Interleukin(IL) 10	IL10	4
interleukin(IL) 10 receptor	IL10R	4
Interleukin(IL) 11	IL11	4
Interleukin(IL) 11 receptor	IL11R	4
Interleukin(IL) 12	IL12	4
Interleukin(IL) 12 receptor, beta 1	IL12RB1	4
Interleukin(IL) 13	IL13	4
Interleukin(IL) 13 receptor	IL13R	4
Interleukin(IL) 2	IL2	4
Interleukin(IL) 2 receptor, alpha	IL2RA	4
Interleukin(IL) 2 receptor, gamma	IL2RG	4
Interleukin(IL) 3	IL3	4
Interleukin(IL) 3 receptor	IL3R	4
Interleukin(IL) 4	IL4	4
Interleukin(IL) 4 receptor	IL4R	4
Interleukin(IL) 5	IL5	4
Interleukin(IL) 5 receptor	IL5R	4

Interleukin(IL) 6	IL6	4
Interleukin(IL) 6 receptor	IL6R	4
Interleukin(IL) 7	IL7	4
Interleukin(IL) 7 receptor	IL7R	4
Interleukin(IL) 8	IL8	4
Interleukin(IL) 8 receptor	IL8R	4
Interleukin(IL) 9	IL9	4
Interleukin(IL) 9 receptor	IL9R	4
Interleukin(IL) receptor antagonist I	IL1RN, IL1RA	4
Isocitrate dehydrogenase		1
Kaliman syndrome gene 1	KAL1	6
Keratin 1	KRT1	3
Keratin 10	KRT10	3
Keratin 11	KRT11	3
Keratin 12	KRT12	3
Keratin 13	KRT13	3
Keratin 14	KRT14	3
Keratin 15	KRT15	3
Keratin 16	KRT16	3
Keratin 17	KRT17,PCHC1	3
Keratin 18	KRT18	3
Keratin 2	KRT2	3
Keratin 3	KRT3	3
Keratin 4	KRT4	3
Keratin 5	KRT5	3
Keratin 6	KRT6	3
Keratin 7	KRT7	3
Keratin 8	KRT8	3
Keratin 9	KRT9	3
Keratin, hair acidic 1	KRTHA1	3
Keratin, hair basic 2	KRTHB1	3
Keratin, hair basic 6	KRTHB6	3
Kininogen, High molecular weight	KNG	4
Lactate dehydrogenase, A	LDHA	1
Lactate dehydrogenase, B	LDHB	1
Lamin A/C	LMNA	6
Laminin 5, alpha 3	LAMA3	6
Laminin 5, beta 3	LAMB3	6
Laminin 5, gamma 2	LAMC2	6
Laminin M	LAMM	6
Laminin receptor 1	LAMRI	6
Latent transforming growth factor-beta binding protein 2	LTBP2	6
Leukocyte-specific transcript 1	LST-1	4
Leukotriene A4 hydrolase		4
Leukotriene A4 synthase	LTA4S	1
Leukotriene B4 receptor		4

Leukotriene B4 synthase	LTB4S	1
Leukotriene C4 receptor		4
Leukotriene C4 synthase	LTC4S	1
LM homeobox transcription factor 1, beta	LMX1B	6
Limb girdle muscular dystrophy 1A	LGMD1A	6
Limb girdle muscular dystrophy 1B	LGMD1B	6
Limb girdle muscular dystrophy 2G	LGMD2G	6
Limb girdle muscular dystrophy 2H	LGMD2H	6
Limbic associated membrane protein	LAMP	6
Lipoprotein receptor, Low Density	LDLR	2
Lipoxygenase 12 (platelets)	LOG12	4
Loricrin	LOR	3
Low density lipoprotein receptor-related protein precursor	LRP	2
Luteinizing hormone-releasing hormone		5
Luteinizing hormone-releasing hormone receptor		5
Lymphotoxin		4
Lysosome-associated membrane protein 1	LAMP1	6
Lysosome-associated membrane protein 2	LAMP2	6
Lysozyme	LYZ	4
Lysyl hydroxylase	PLOD	1
Lysyl oxidase	LOX	1
Macrophage activating factor	MAF	4
Macrophage inflammatory protein-1	MIP1	4
Macrophage inflammatory protein-1	receptor	4
Macrophage inflammatory protein-2	MIP2	4
Macrophage inflammatory protein-2 receptor		4
MADS box transcription-enhancer factor 2A	MEF2A	6
MADS box transcription-enhancer factor 2B	MEF2B	6
MADS box transcription-enhancer factor 2C	MEF2C	6
MADS box transcription-enhancer factor 2D	MEF2D	6
Mannose binding protein	MBP	4
Mannosidase, alpha B lysosomal	MANB	1
Mannosidase, beta A lysosomal	MANBA	1
Marenostrin	MEFV	2
Matrix Gla protein	MGP	6
Matrix metalloproteinase 1	MMP1	1
Matrix metalloproteinase 10	MMP10	1
Matrix metalloproteinase 11	MMP11	1
Matrix metalloproteinase 12	MMP12	1
Matrix metalloproteinase 13	MMP13	1
Matrix metalloproteinase 14	MMP14	1
Matrix metalloproteinase 15	MMPI 5	1
Matrix metalloproteinase 16	MMP16	1
Matrix metalloproteinase 17	MP17	1
Matrix metalloproteinase 18	MMP18	1

Matrix metalloproteinase 19	MMP19	1
Matrix metalloproteinase 2	MMP2	1
Matrix metalloproteinase 3	MMP3, STMYJ	1
Matrix metalloproteinase 4	MMP4	1
Matrix metalloproteinase 5	MMP5	1
Matrix metalloproteinase 6	MMP6	1
Matrix metalloproteinase 7	MMP7	1
Matrix metalloproteinase 8	MMP8	1
Matrix metalloproteinase 9	MMP9	1
MEK kinase, MEKK		1
Melanocortin 1 receptor	MC1R	2
Melanocortin 2 receptor	MC2R	2
Melanocortin 4 receptor	MC4R	2
Mesoderm-specific transcript	MEST	6
Methylguanine-DNA methyltransferase	MGMT	1
Methylmalonyl-CoA mutase	MUT	1
Mevalonate kinase	MVK	1
MHC Class 1: A		4
MHC Class 1: B		4
MHC Class 1: C		4
MHC Class 1: LMP-2, LMP-7		4
MHC Class 1: Tap1	ABCR, TAP1	4
MHC Class II: DP	HLA-DPB1	4
MHC Class II: DQ		4
MHC Class II: DR		4
MHC Class II: Tap2	TAP2,PSF2	4
MHC Class II:Complementation group A	MHC2TA	4
MHC Class II:Complementation group B	RFXANK	4
MHC Class II:Complementation group C	RFX5	4
MHC Class II:Complementation group D	RFXAP	4
Microphthalmia-associated transcription factor	MITF	6
Midline 1	MID1	6
Mitochondrial trifunctional protein, alpha subunit	HADHA	1
Mitochondrial trifunctional protein, beta subunit	HADHB	1
Moesin, MSN		3
Molybdenum cofactor synthesis 1	MOCS1	1
Molybdenum cofactor synthesis 2	MOCS2	1
Monoamine oxidase A	MAOA	1
Monoamine oxidase B	MAOB	1
Monocyte chemoattractant protein 1	MCP1	4
Mucopolidoses	GNPTA	1
Mulibrey nanism	MUL	2
Muscarinic receptor, M1	CHRM1	5
Muscarinic receptor, M2	CHRM2	5

Muscarinic receptor, M3	CHRM3	5
Muscarinic receptor, M4	CHRM4	5
Muscarinic receptor, M5	CHRM5	5
Muscle phosphorylase	PYGM	1
Mutated in colorectal cancers, MCC	MCC	6
MutS homolog 3	MSH3	6
Myeloperoxidase	MPO	4
Myocilin	MYOC	2
Myogenic factor 3	MYF3	6
Myogenic factor 4	MYF4	6
Myogenic factor 5	MYF5	6
Myoglobin		2
Myomesin 1	MYOM1	3
Myomesin 2	MYOM2	3
Myopia 1	MYP1	2
Myopia 2	MYP2	2
Myosin 15	MYO15	3
Myosin 5A	MYO5A	3
Myosin 6	MYO6	3
Myosin 7A	MYO7A	3
Myosin, cardiac	MYH7	3
Myosin, light chain 2	MYL2	3
Myosin, light chain 3	MYL3	3
Myotubuladin	MTM1	3
Na <sup>+</sup> , K <sup>+</sup> ATPase, alpha	ATP1A1	6
Na <sup>+</sup> , K <sup>+</sup> ATPase, beta 1	ATP1B1	6
Na <sup>+</sup> , K <sup>+</sup> ATPase, beta 2	ATP1B2	6
Na <sup>+</sup> , K <sup>+</sup> ATPase, beta 3	ATP1B3	6
Na <sup>+</sup> /H <sup>+</sup> exchanger 1	NHE1	2
Na <sup>+</sup> /H <sup>+</sup> exchanger 2	NHE2	2
Na <sup>+</sup> /H <sup>+</sup> exchanger 3	NHE3	2
Na <sup>+</sup> /H <sup>+</sup> exchanger 4	NHE4	2
Na <sup>+</sup> /H <sup>+</sup> exchanger 5	NHE5	2
N-acetylgalactosamine-6-sulfate sulfatase	GALNS	1
N-acetylglucosamine-6-sulfatase	GNS	1
N-acetylglucosaminidase, alpha	NAGLU	1
NADH dehydrogenase		1
NADH-cytochrome b5 reductase	DIA1	1
reductase		
NB6		4
Nebulin	EB	3
Nephrosis 1	NPHS1	2
Neural retina-specific gene	NRL	6
Neuraminidase sialidase	NEU	2
Neuregulin	HGL	6
Neurexin		5
Neuroendocrine convertase 1	NEC1, PCSK1	1

Neurokinin A	NKNA	5
Neurokinin B	NKNB	5
Neuropeptide Y	NPY	5
Neuropeptide Y receptor Y1	NPY1R	5
Neuropeptide Y receptor Y2	NPY2R	5
Neurotensin	NTS	5
Neurotensin receptor	NTSR1	5
Nibrin	NBS1	6
Noggin	NOG	6
Notch ligand - jagged 1	JAG 1, AGS	6
Nuclear factor 1-kappa-B-like gene	IKBL	4
Nuclear factor kappa beta	NFKB	4
Nuclear factor of activated T cells (NFAT) complex, cytosolic	NFATC	6
Nuclear factor of activated T cells (NFAT) complex, preexisting component	NFATP	6
Ocular albinism 1	OA1	3
Oculocutaneous albinism 11	OCA2	3
Oncogene ERG (early reponse gene)		6
Oncogene fos	FOS	6
Oncogene GLI1	GLI	6
Oncogene GLI2	GLI2	6
Oncogene GLI3	GLI3	6
Oncogene sis	PDGFB	6
Oncogene src		6
Opioid receptor, delta	OPRD1	5
Opioid receptor, kappa	OPRK1	5
Opioid receptor, mu	OPRM1	5
Ornithine delta-aminotransferase	OAT	1
Osteocalcin		3
Osteonectin	ON	6
Osteopontin	OPN	6
Osteoprotegerin	OPG	6
Oxytocin	OXT	5
Oxytocin receptor	OXTR	5
p21-activated kinase 3	PAK3	6
Paired box homeotic gene 1	PAX1	6
Paired box homeotic gene 2	PAX2	6
Paired box homeotic gene 3	PAX3	6
Paired box homeotic gene 6	PAX6	6
Paired box homeotic gene 7	PAX7	6
Paired box homeotic gene 8	PAX8	6
Paired-like homeodomain transcription factor 2	PITX2	6
Paired-like homeodomain transcription factor 3	PITX3	6
Parathyroid hormone	PTH	6



Parathyroid hormone receptor	PTHR1	6
Parathyroid hormone related-peptide	PTHRP	6
Parathyroid hormone-like hormone	PTHLH	6
Patched (Drosophila) homolog, PTCH	PTCH	6
Peanut-like 1	PNUTL1	4
Peripherin, PRPH		3
Peroxisomal membrane protein 1	PXMP1	3
Peroxisoma membrane protein 3	PXMP3	2
Peroxisome biogenesis factor 1	PEX1	2
Peroxisome biogenesis factor 19	PEX19	2
Peroxisome biogenesis factor 6	PEX6	2
Peroxisome biogenesis factor 7	PEX7	2
Peroxisome receptor 1	PXR1	2
Phenylethanolamine N-methyltransferase, PNMT	PNMT	1
Phosphate regulating gene with homologies to endopeptidases on the X chromosome	PHEX	6
Phosphodiesterase 1 / nucleotide pyrophosphatase 1	PDNP1	6
Phosphodiesterase 1 / nucleotide pyrophosphatase 2	PDNP2	6
Phosphodiesterase 1 / nucleotide pyrophosphatase 3	PDNP3	6
Phosphofructokinase, muscle	PFKM	1
Phosphoglucose isomerase	GPI	1
Phosphoglycerate kinase 1	PGK1	1
Phosphoglycerate mutase 2	PGAM2	1
Phospholipase A2, group 10	PLA2G10	4
Phospholipase A2, group 1B	PLA2G1B	
Phospholipase A2, group 2A	PLA2G2A	
Phospholipase A2, group 2B	PLA2G2B	4
Phospholipase A2, group 4A	PG4A	4
Phospholipase A2, group 4C	P 2G4C	4
Phospholipase A2, group 5	PLA2G5	4
Phospholipase A2, group 6	PLA2G6	4
Phosphomannomutase 2	PMM2	6
Phosphoribosyl pyrophosphate synthetase	PRPS1	1
Phosphorylase kinase, alpha 1 (muscle)	PHKA1	1
Phosphorylase kinase, beta	PHKB	1
Phosphorylase kinase, delta		1
Phosphorylase kinase, gamma 2	PHKG2	1
Phytanoyl-CoA hydroxylase	PHYH	6
Pineolytic beta-receptors		1
Plakophilin 1	PKP1	2
Plasminogen	PLG	1
Platelet derived growth factor	PDGF	6
Platelet derived growth factor receptor	PDGFR	6

Plectin 1	PLEC1	2
Potassium inwardly-rectifying channel J1	KCNJ1	5
Potassium voltage-gated channel E1	KCNE1	5
Potassium voltage-gated channel Q1	KCNQ1	5
Potassium voltage-gated channel Q2	KCNQ2	5
Potassium voltage-gated channel Q3	KCNQ3	5
POU domain, class 3, transcription factor 4	POU3F4	6
POU domain, class 4, transcription factor 3	POU4F3	6
Prion protein	PRNP	5
Procollagen N-protease		1
Procollagen peptidase		1
Prodynorphin		5
Profibrinolysin		6
Prolactin receptor	PRLR	6
Prolactin releasing hormone	PRH	6
Proliferin	PLF	6
Proopiomelanocortin	POMC	5
Properdin P factor, complement	PFC, PFD	4
Prophet of Pit1	PROP1	6
Propionyl-CoA carboxylase, alpha	PCCA	1
Prosaposin	PSAP	5
Prostacyclin synthase		4
Prostaglandin 15-OH dehydrogenase	HGPD;PGDH	4
Prostaglandin D - DP receptor		4
Prostaglandin E1 receptor		4
Prostaglandin E2 receptor		4
Prostaglandin E3 receptor		4
Prostaglandin F - FP receptor		4
Prostaglandin F2 alpha receptor		4
Prostaglandin I2 receptor		2
Prostaglandin IP receptor		4
Prostaglandin isomerase		6
Protease nexin 2	PN2	1
Protective protein for beta-galactosidase	PPGB	1
Protein C	PROC	4
Proteinase 3		4
Purine nucleoside phosphorylase	NP	1
Purinergic receptor P1A1		5
Purinergic receptor P1A2		5
Purinergic receptor P1A3		5
Purinergic receptor P2X, 1	P2RX1	5
Purinergic receptor P2X, 2	P2RX2	5
Purinergic receptor P2X, 3	P2RX3	5
Purinergic receptor P2X, 4	P2RX4	5
Purinergic receptor P2X, 5	P2RX5	5
Purinergic receptor P2X, 6	P2RX6	5
Purinergic receptor P2X, 7	P2RX7	5

Purinergic receptor P2Y, 1	P2RY1	5
Purinergic receptor P2Y, 11	P2RY11	5
Pu nergic receptor P2Y, 2	P2RY2	5
Pyrroline-5-carboxylate synthetase	PYCS	1
Pyruvate kinase	PKLR	1
Rabphilin		5
Radixin	RDX	3
RAS-associated protein, RAB3A	RAB3A	5
Rathke pouch homeobox, RPX	RPX	6
Receptor tyrosine kinase (RTK), NSK2	NSK2	6
Retina pigment epithelium specific protein (65kD)	RPE65	3
Retinitis pigmentosa gene 1	RP1	3
Retinitis pigmentosa gene 2	RP2	3
Retinitis pigmentosa gene 3	RP3	3
Retinitis pigmentosa gene 6	RP6	3
Retinitis pigmentosa gene 7	RP7, RDS	3
Retinoblastoma 1	RB1	6
Retinoic acid receptor, alpha	RARA	6
Retinoic acid receptor, beta	RARB	6
Retinoic acid receptor, gamma	RARG	6
Retinoid X receptor, alpha	RXRA	6
Retinoid X receptor, beta	RXRB	6
Retinoid X receptor, gamma	RXRG	6
Retinol binding protein 4	RBP4	2
Rhodopsin	RHO	3
RIGUI	RIGUI	6
Rim		5
Rod outer segment membrane protein 1	ROM1	3
Ryanodine receptor 1, skeletal	RYR1	6
Serotonin N-acetyltransferase	SNAT	1
Serotonin receptor, 5HT1A	HTR1A	5
Serotonin receptor, 5HT1B	HTR1B	5
Serotonin receptor, 5HT1C	HTR1C	5
Serotonin receptor, 5HT1D	HTR1D	5
Serotonin receptor, 5HT1E	HTR1E	5
Serotonin receptor, 5HT1F	HTR1F	5
Serotonin receptor, 5HT2A	HTR2A	5
Serotonin receptor, 5HT2B	HTR2B	5
Serotonin receptor, 5HT2C	HTR2C	5
Serotonin receptor, 5HT3	HTR3	5
Serotonin receptor, 5HT4	HTR4	5
Serotonin receptor, 5HT5	HTR5	5
Serotonin receptor, 5HT6	HTR6	5
Serotonin receptor, 5HT7	HTR7	5
Sex hormone binding globulin, SHBG		2
Sialoprotein, bone	BSP	6

Signal transducer and activator of transcription 1	STAT1	6
Signaling lymphocyte activation molecule	SLAM	4
Sine oculis homeobox, drosophila, homolog 1	SIX1	6
Sine oculis homeobox, drosophila, homolog 2	SIX2	6
Sine oculis homeobox, drosophila, homolog 5	SIX5	3
Sjogren (Sjogren) syndrome antigen A1	SSA1	4
Slug protein		6
Small nuclear ribonucleoprotein polypeptide N	SNRPN	3
Smoothelin	SMTN	6
Smoothened (Drosophila) homolog	SMOH	6
Sodium channel, non-voltage gated 1, alpha	SCNN1A	5
Sodium channel, non-voltage gated 1, beta	SCNN1B	5
Sodium channel, non-voltage gated 1, gamma	SCNN1G	5
Sodium channel, voltage gated, type IV, alpha polypeptide	SCN4A	5
Sodium channel, voltage gated, type V, alpha polypeptide	SCN5A	5
Sodium channel, voltage-gated, type 1, beta polypeptide	SCN1B	5
Solute carrier family 1 (glutamate transporter), member 1	SLC1A1	2
Solute carrier family 1 (glutamate transporter), member 2	SLC1A2	2
Solute carrier family 12, member 1	SLC12A1	2
Solute carrier family 12, member 2	SLC12A2	2
Solute carrier family 12, member 3	SLC12A3	2
Solute carrier family 16 (monocarboxylate transporter), member 1	SLC16A1	2
Solute carrier family 16 (monocarboxylate transporter), member 7	SLC16A7	2
Solute carrier family 17, member 1	SLC17A1	2
Solute carrier family 17, member 2	SLC17A2	2
Solute carrier family 19 (folate transporter), member 1	SLC19A1	2
Solute carrier family 21, member 2	SLC21A2	2
Solute carrier family 21, member 3	SLC21A3	2
Solute carrier family 25, member 12	SLC25A12	2
Solute carrier family 6 (GAMMA-AMINO BUTYRIC ACID transporter), member 1	SLC6A1	2
Solute carrier family 6 (neurotransmitter transporter, dopamine), member 3	SLC6A3	2
Solute carrier family 6 (neurotransmitter transporter, noradrenaline), member 2	SLC6A2	2

Solute carrier family 6, member 10	SLC6A10	2
Solute carrier family 6, member 8	SLC6A8	2
Solute carrier family 7(amino acid transporter), member 1	SLC7A1	2
Solute carrier family 7(amino acid transporter), member 2	SLC7A2	2
Solute carrier family 7(amino acid transporter), member 7	SLC7A7	2
Solute carrier family 8 (sodium/calcium exchanger), member 1	SLC8A1	2
Somatostatin	SST	5
Somatostatin receptor, SSTR1	SSTR1	5
Somatostatin receptor, SSTR2	SSTR2	6
Somatostatin receptor, SSTR3	SSTR3	5
Somatostatin receptor, SSTR4	SSTR4	5
Somatostatin receptor, SSTR5	SSTR5	5
Sonic hedgehog, SHH	SHH	6
Sorbitol dehydrogenase	SORD	1
Sorcin	SRI	2
Spectrin alpha	SPTA1	3
Spectrin beta	SPTB	3
Sperm adhesion molecule	SPAM1	6
Sperm prolamine P1	PRM1	6
Sperm prolamine P2	PRM2	6
Sphingomyelinase	SMPD1	1
Split hand/foot malformation gene	DSS1	6
SRY-box 10	SOX10	6
SRY-box 11	SOX11	6
SRY-box 3	SOX3	6
SRY-box 4	SOX4	6
SRY-box 9	SOX9	6
Steroid 5 alpha reductase 1	SRD5A1	1
Steroid 5 alpha reductase 2	SRD5A2	1
Steroid sulphatase	STS	1
Substance P		5
Succinate dehydrogenase 1	SDH1	1
Succinate dehydrogenase 2	SDH2	1
Sulfamidase	SGSH	6
Superoxide dismutase 1	SOD1	1
Superoxide dismutase 3	SOD3	1
Survival of motor neuron 1, telomeric	SMN1	2
Synapsin I a & I b	SYN1	5
Synapsin 2a & 2b	SYN2	5
Synaptic vesicle protein 2	SV2	5
Synaptobrevin 1	SYB1	5
Synaptobrevin 2	SYB2	5
Synaptogyrin		5

Synaptophysin	SYP	5
Synaptosomal-associated protein, 25KD	SNAP25	5
Synaptotagmin 1	SYT1	5
Synaptotagmin 2	SYT2	5
Synovial sarcoma gene 1	SSX1	6
Synovial sarcoma gene 2	SSX2	6
Syntaxin 1	STX1	5
Tachykinin receptor, NK1R	TACR1	5
Tachykinin receptor, NK2R	TACR2	5
Tachykinin receptor, NK3R	TACR3	5
Talin, TLN		3
T-BOX 1	TBX1	6
T-BOX 2	TBX2	6
T-BOX 3	TBX3	6
T-BOX 4	TBX4	6
T-BOX 5	TBX5	6
T-BOX 6	TBX6	6
TEK, tyrosine kinase, endothelial	TEK	1
Telomerase protein component		1
Tetranectin	TNA	2
Thrombospondin	THBS1	6
Thromboxane A synthase 1	TBXAS1	4
Thromboxane A2	TXA2	4
Thromboxane A2 receptor	TBXA2R	4
Thymosin		4
Thyrotropin releasing hormone	TRH	5
Thyrotropin releasing hormone	TRH	6
Thyrotropin releasing hormone receptor	TRHR	5
Tip-associated protein	TAP	4
Tissue non-specific alkaline phosphatase		1
TNSAP		
Titin	TTN	3
Tocopherol (alpha) transfer protein	TTPA	2
Torticollis, keloids, cryptorchidism and renal dysplasia gene	TKCR	6
Transforming growth factor, alpha	TGFA	6
Transforming growth factor, beta 2	TGFB2	6
Transforming growth factor, beta induced	TGFBI	6
Transforming growth factor, beta receptor 2	TGFBR2	6
Transglutaminase 1	TGM1	6
Transglutaminase 2	TGM2	6
Transglutaminase 4	TGM4	6
Transthyretin	TTR	2
Treacle gene	TCOF1	6
Triosephosphate isomerase	TPI 1	1
Tropomyosin 1 alpha	TPM1	3
Tropomyosin 3 (non-muscle)	TPM3	3

Troponin C		3
Troponin I	TNNI3	3
Troponin T2, cardiac	TNNT2	3
Trypsinogen 1	TRY1	1
Trypsinogen 2	TRY2	1
Tubby-like protein	TULP1	6
Tuberous sclerosis 1	TSC1	6
Tuberous sclerosis 2	TSC2	6
Tumor susceptibility gene 101	TSG101	6
Tumour necrosis factor (TNF) receptor associated factor 1	TRAF1	4
Tumour necrosis factor (TNF) receptor associated factor 2	TRAF2	4
Tumour necrosis factor (TNF) receptor associated factor 3	TRAF3	4
Tumour necrosis factor (TNF) receptor associated factor 4	TRAF4	4
Tumour necrosis factor (TNF) receptor associated factor 5	TRAF5	4
Tumour necrosis factor (TNF) receptor associated factor 6	TRAF6	4
Tumour necrosis factor alpha	TNFA	4
Tumour necrosis factor alpha receptor	TNFAR	4
Tumour necrosis factor beta	TNFB	4
Tumour necrosis factor beta receptor	TNFBR	4
Tumour protein p53	TP53,P53	6
Tumour protein p63	TP63	6
Tumour protein p73	TP73	6
Tumour protein, translationally-controlled 1	TPT1	6
Tumour suppressor gene DRA	DRA	4
Tyrosinase	TYR	1
Tyrosinase-related protein 1	TYRP1	1
Tyrosine aminotransferase	TAT	1
Ubiquitin activating enzyme, E1		1
Ubiquitin protein ligase E3A	UBE3A	1
Uncoupling protein 3	UCP3	2
Undulin 1	COL14AI	3
Uroporphyrinogen decarboxylase	UROD	1
Usher syndrome 2A	USH2A	3
Vacuolar proton pump, subunit 1	VPP1	5
Vacuolar proton pump, subunit 3	VPP3	5
Vascular endothelial growth factor	VEGF	6
Vasoactive intestinal polypeptide	VIP	5
Vasoactive intestinal polypeptide receptor	VIPR	5
Villin		3
Vinculin		3
Vitamin D receptor	VDR	6

Vitelliform macular dystrophy, atypical gene	VMD1	2
Von Hippel-Lindau gene	VHL	6
Von Willebrand factor	VWF	2
Werner syndrome helicase	WRN	6
Winged helix nude	WHN	6
Wingless family, wnt2	WNT2	6
Wingless family, wnt4	WNT4	6
Wingless family, wnt5	WNT5	6
Wingless family, wnt7	WNT7	6
Wingless family, wnt8	WNT8	6
Wiskott-Aldrich syndrome protein	WASP, THC	4
Wnt inhibitory factor, WIF-1	WIF1	6
Wolf-Hirschhorn syndrome candidate 1 gene	WHSC1	6
Wolfram syndrome 1 gene	WFS1	3
Xeroderma pigmentosum, complementation group A	XPA	1
Xeroderma pigmentosum, complementation group B	XPB	1
Xeroderma pigmentosum, complementation group C .	XPC	1
Xeroderma pigmentosum, complementation group D		1
Xeroderma pigmentosum, complementation group E		1
Xeroderma pigmentosum, complementation group F	XPF	1
Xeroderma pigmentosum, complementation group G	ERCC5	1
X-ray repair gene	XRCC9	6,

Legende für die Spalte Proteinfunktion:

1	Enzym	2	Transport und Lagerung
3	Struktur	4	Immunität
5	Nervale Transmission	6	Wachstum und Differenzierung



**Tabelle 14****endokrine und metabolische Fehlfunktion, Schädigung oder Erkrankung**

<b>Liste der Gene</b>	<b>HUGO Gensymbol</b>	<b>Protein- funktion</b>
17beta Hydroxysteroid dehydrogenase 1	HSD17B1	1
17beta Hydroxysteroid dehydrogenase 3	HSD17B3	1
17beta Hydroxysteroid dehydrogenase 4	HSD17B4	1
17beta Hydroxysteroid oxidoreductase		1
17-Ketosteroid reductase		5
18-Hydroxysteroid oxidoreductase		1
2,3-Bisphosphoglycerate mutase	BPGM	1
2,4-Dienoyl CoA reductase	DECR	1
3 beta Hydroxysteroid dehydrogenase 2	HSD3B2	1
3-Oxoacid CoA transferase	OXCT	1
5-Adenosyl homocysteine hydrolase		1
6-Phosphofructo-2-kinase	PFKFBL	1
6-Pyruvoyltetrahydropterin synthase	PTS	1
Acetoacetyl 1-CoA-thiolase	ACAT1	1
Acetyl CoA acyltransferase	ACAA	1
Acetyl CoA carboxylase	ACC	1
Acetyl CoA carboxylase alpha	ACACA	1
Acetylcholinesterase	ACHE	1
Acid phosphatase 2, lysosomal	ACP2	1
Actin, alpha, cardiac	ACTC	3
Actin, alpha, skeletal	ACTA1	3
Actin, alpha, smooth, aortic	ACTA2	3
Activin		6
Activin A receptor, type 2B	ACVR2B	6
Activin A receptor, type 2-like kinase 1	ACVRL1	6
Acyl CoA dehydrogenase, long chain	ACADL	1
Acyl CoA dehydrogenase, medium chain	ACADM	1
Acyl CoA dehydrogenase, short chain	ACADS	1
Acyl CoA dehydrogenase, very long chain	ACADVL	1
Acyl CoA synthetase, long chain, 1	LACS1	1
Acyl CoA synthetase, long chain, 2	LACS2	1
Acyl CoA synthetase, long chain, 4	ACS4	1
Acyl malonyl condensing enzyme		1
Adenomatous polyposis coli tumour suppressor gene	APC	6
Adenosine deaminase	ADA	1
Adenosine monophosphate deaminase	AMPD	1
Adenosine receptor A1	ADORA1	5
Adenosine receptor A2A	ADORA2A	5
Adenosine receptor A2B	ADORA2B	5
Adenosine receptor A3	ADORA3	5

Adenyl cyclase		5
Adenylate cyclase 1	ADCY1	1
Adenylate cyclase 2	ADCY2	1
Adenylate cyclase 3	ADCY3	1
Adenylate cyclase 4	ADCY4	1
Adenylate cyclase 5	ADCY5	1
Adenylate cyclase 6	ADCY6	1
Adenylate cyclase 7	ADCY7	1
Adenylate cyclase 8	ADCY8	1
Adenylate cyclase 9	ADCY9	1
Adenylate transferase		1
ADP-ribosyltransferase	ADPRT	1
Adrenergic receptor, alphas	ADRA1	5
Adrenergic receptor, alpha2	ADRA2	5
Adrenergic receptor, beta1	ADRB1	5
Adrenergic receptor, beta2	ADRB2	5
Adrenergic receptor, beta3	ADRB3	5
Adrenoleukodystrophy gene	ALD	1
Albumin, ALB	ALB	2
Alcohol dehydrogenase	ADH	1
Alcohol dehydrogenase 2	ADH2	1
Alcohol dehydrogenase 3	ADH3	1
Alcohol dehydrogenase 4	ADH4	1
Alcohol dehydrogenase 5	ADH5	1
Alcohol dehydrogenase 6	ADH6	1
Alcohol dehydrogenase 7	ADH7	1
Aldehyde dehydrogenase 1	ALDH1	1
Aldehyde dehydrogenase 10	ALDH10	1
Aldehyde dehydrogenase 2	ALDH2	1
Aldehyde dehydrogenase 5	ALDH5	1
Aldehyde dehydrogenase 6	ALDH6	1
Aldehyde dehydrogenase 7	ALDH7	1
Aldolase A	ALDOA	1
Aldolase B	ALDOB	1
Aldolase C	ALDOC	1
Aldosterone receptor	MLR	6
Alkaline phosphatase, liver/bone/kidney	ALPL	2
Alkylglycerone phosphate synthase	AGPS	1
Alpha 1 acid glycoprotein	AAG; AGP	2
alpha1-antitrypsin	PI	1
alpha-actinin 2	ACTN2	6
alpha-actinin 3	ACTN3	6
alpha-amino adipic semialdehyde synthase		1
alpha-glucosidase, neutral AB	GANAB	1
alpha-glucosidase, neutral C	GANC	1
alpha-ketoglutarate dehydrogenase		1
Aminomethyltransferase	AMT	1

Aminopeptidase P	XPNPEP2	1
Amphiregulin	AREG	6
Amylo-1,6-glucosidase	AGL	1
Androgen receptor	AR	6
Angiopoietin 1	ANGPT1	6
Angiopoietin 2	ANGPT2	6
Angiotensin converting enzyme	ACE,DCPL	1
Angiotensin receptor 1	AGTR1	2
Angiotensin receptor 2	AGTR2	2
Angiotensinogen	AGT	1
Anti-Mullerian, hormone	AMH	6
Anti-Mullerian hormone type 2 receptor	AMHR2	6
Apolipoprotein A I	APOA1	2
Apolipoprotein A II	APOA2	2
Apolipoprotein B	APOB	2
Apolipoprotein C1	APOC1	2
Apolipoprotein C2	APOC2	2
Apolipoprotein C3	APOC3	2
Apolipoprotein D	APOD	2
Apolipoprotein E	APOE	2
Apolipoprotein H	APOH	2
Aquaporin 1	AQP1	2
Aquaporin 2	AQP2	2
Arginine vasopressin	AVP	5
Arginine vasopressin receptor 1A	AVPR1A	5
Arginine vasopressin receptor 2B	AVPR1B	5
Arginine vasopressin receptor 2	AVPR2	5
Asparagine synthetase	AS	1
Aspartate transcarbamoylase		1
Ataxia telangiectasia complementation group D	ATD,ATDC	6
Ataxia telangiectasia gene, AT	ATM	6
ATP cobalamin adenosyltransferase		1
Atrial natriuretic peptide	ANP	6
Atrial natriuretic peptide receptor A	NPR1	6
Atrial natriuretic peptide receptor B	NPR2	6
Atrial natriuretic peptide receptor C	NPR3	6
Attractin		
Autoimmune regulator, AIRE	AIRE	
beta-endorphin receptor		5
beta-galactosidase	GLB I	1
beta-ketoacyl reductase		1
Bile acid coenzyme A: amino acid N-acyltransferase	BAAT	1
Bile salt export pump	BSEP, PFIC2	2
Bile salt-stimulated lipase	CEL	1
Bilirubin UDP-glucuronosyltransferase		1
Bloom syndrome protein	BLM	6

Bradykinin receptor B1		4
Bradykinin receptor B2		4
Branched chain aminotransferase 1, cytosolic	BCAT1	1
Branched chain aminotransferase 2, mitochondrial	BCAT2	1
Branched chain keto acid dehydrogenase E1, alpha polypeptide	BCKDHA	1
Branched chain keto acid dehydrogenase E1, beta polypeptide	BCKDHB	1
Butyrylcholinesterase	BCHE	1
C17-20 desmolase		1
C3 convertase		1
Calbindin 1	CALB1	6
Calbindin DgK	CALB3	6
Calcineurin A1	CALNA1	4
Calcineurin A2	CALNA2	4
Calcineurin A3	CALNA3	4
Calcineurin B		4
Calcitonin receptor /Calcitonin gene-related peptide receptor	CALCR	5
Calcitonin/Calcitonin gene-related peptide alpha	CALCA	5
Calcium channel, voltage-dependent, alpha I F subunit	CACNA1F	5
Calcium channel, voltage-dependent, Alpha-I B (CACNL1A5)	CACNA1B	5
Calcium channel, voltage-dependent, Alpha-1 C	CACNA1C	5
Calcium channel, voltage-dependent, Alpha- I D	CACNA1D	5
Calcium channel, voltage-dependent, Alpha-1 E (CACN1A6)	CACNA1E	5
Calcium channel, voltage-dependent, Alpha-2/delta	CACNA2	5
Calcium channel, voltage-dependent, Beta 1	CACNB1	5
Calcium channel, voltage-dependent, Beta 3	CACNB3	5
Calcium channel, voltage-dependent, L type, alpha 1S subunit	CACNALS	5
Calcium channel, voltage-dependent, Neuronal, Gamma	CACNG2	5
Calcium channel, voltage-dependent, P/Q type, alpha 1A subunit	CACNA1A	5
Calcium channel, voltage-dependent, T-type		5
Calcium sensing receptor	CASR	2
Calmodulin 1	CALM1	6
Calmodulin 2	CALM2	6
Calmodulin 3	CALM3	6
Calmodulin-dependant protein kinase II	CAMK2A	6
Calnexin	CANX	6
Calpain	CAPN,CAPN3	1

Calretinin	CALB2	5
Canalicular multispecific organic anion transporter	CMOAT	2
Cannabinoid receptor	CNR1	5
Carbonic anhydrase 3	CA3	1
Carbonic anhydrase 4	CA4	1
Carbonic anhydrase, alpha	CA1	1
Carbonic anhydrase, beta	CA2	1
Carboxylesterase 1	CES1	1
Cardiac-specific homeobox, CSX	CSX	6
Carnitine acetyltransferase	CRAT	1
Carnitine acylcarnitine translocase	CACT	1
Carnitine palmitoyltransferase I	CPT1A	1
Carnitine palmitoyltransferase II	CPT2	1
Carnitine transporter protein	CDSP, SCD	2
Carnosinase		5
Cartilage-hair hypoplasia gene	CHH	5
Catechol-o-methyltransferase	COMT	1
Cell adhesion molecule, intercellular, ICAM	ICAM1	6
Cell adhesion molecule, leukocyte-endothelial, LECA (CD62)	LECAM1	6
Cell adhesion molecule, liver, LCAM	LCAM	6
Cell adhesion molecule, neural, NCAM1	NCAM1	6
Cell adhesion molecule, neural, NCAM2	NCAM2	6
Cell adhesion molecule, platelet-endothelial, PECAM	PECAM1	6
Cell adhesion molecule, vascular, VCAM	VCAM1	6
c-erbB2	ERBB2	6
c-erbB3	ERBB3	6
c-erbB4	ERBB4	6
Chitotriosidase	CHIT	1
Cholecystokinin	CCK	5
Cholecystokinin B receptor	CCKBR	5
Cholesterol ester hydroxylase		1
Cholesterol ester transfer protein	CETP	2
Choline acetyltransferase	CHAT	1
Chromogranin A	CHGA	6
Chymase	CHY1	
Citrate synthase		1
Clathrin		2
Clusterin	CLU	6
CoA transferase		1
Collagen IV alpha 5	COL4A5	3
Collagen IV alpha 6	COL4A6	3
Complex III		1
Complex V	MTATP6	1
Corticosteroid binding globulin	CBG	5

Corticotrophin-releasing hormone	CRH	2
Corticotrophin-releasing hormone receptor	CRHR1	2
Cortisol receptor		4
Cubilin	CUBN	2
Cyclic AMP-dependent protein kinase	PKA	1
Cyclic nucleotide phosphodiesterase 1B	PDE1B	1
Cyclic nucleotide phosphodiesterase 1B1	PDE1B1	1
Cyclic nucleotide phosphodiesterase 2A3	PDE2A3	1
Cyclic nucleotide phosphodiesterase 3A	PDE3A	1
Cyclic nucleotide phosphodiesterase 3B	PDE3B	1
Cyclic nucleotide phosphodiesterase 4A	PDE4A	1
Cyclic nucleotide phosphodiesterase 4C	PDE4C	1
Cyclic nucleotide phosphodiesterase 5A	PDE5A	1
Cyclic nucleotide phosphodiesterase 6A	PDE6A	1
Cyclic nucleotide phosphodiesterase 6B	PDE6B	1
Cyclic nucleotide phosphodiesterase 7	PDE7	1
Cyclic nucleotide phosphodiesterase 8	PDE8	1
Cyclic nucleotide phosphodiesterase 9A	PDE9A	1
Cyclin-dependent kinase inhibitor 1C (P57, KIP2)	CDKN1C	6
Cyclin-dependent kinase inhibitor 2A (p16)	CDKN2A	6
Cyclooxygenase I	COX1	1
Cyclooxygenase 2	COX2	1
CYP11A1	CYP11A1	1
CYP11B1	CYP11B1	1
CYP11B2	CYP11B2	1
CYP17	CYP17	1
CYP19	CYP19	1
CYP1A1	CYP1A1	1
CYP1A2	CYP1A2	1
CYP1B1	CYP1B1	1
CYP21	CYP21	1
CYP24	CYP24	1
CYP27	CYP27	1
CYP27B1	PDDR	1
CYP2A1	CYP2A1	1
CYP2A13	CYP2A13	1
CYP2A3	CYP2A3	1
CYP2A6V2	CYP2A6V2	1
CYP2A7	CYP2A7	1
CYP2B6	CYP2B6	1
CYP2C18	CYP2C18	1
CYP2C19	CYP2C19	1
CYP2C8	CYP2C8	1
CYP2C9	CYP2C9	1
CYP2D6	CYP2D6	1
CYP2E1	CYP2E1	1

CYP2F1	CYP2F1	1
CYP2J2	CYP2J2	1
CYP3A3	CYP3A3	1
CYP3A4	CYP3A4	1
CYP3A5	CYP3A5	1
CYP3A7	CYP3A7	1
CYP4AII	CYP4AII	1
CYP4BI	CYP4BI	1
CYP4F2	CYP4F2	1
CYP4F3	CYP4F3	1
CYP51	CYP51	1
CYP5A1	CYP5A1	1
CYP7A	CYP7A	1
CYP8	CYP8	1
Cystathionase	CTH	1
Cystathione beta synthase	CBS	1
Cystic fibrosis transmembrane conductance regulator, CFTR	CFTR	5
Cystinosin	CTNS	2
Cytidine deaminase	CDA	1
Cytidine-5-prime-triphosphate synthetase	CTPS	1
Cytochrome a		1
Cytochrome c		1
Cytochrome c oxidase, MTCO		1
Cytokine-suppressive antiinflammatory drug- binding protein 1	CSBP1	4
Cytokine-suppressive antiinflammatory drug- binding protein 2	CSBP2	4
DAX1 nuclear receptor	DAX1	4
D-beta-hydroxybutyrate dehydrogenase		1
Dehydratase		1
Delta 4-5 oxosteroid isomerase		1
Delta aminolevulinate synthase 1	ALAS1	1
Delta aminolevulinate synthase 2	ALAS2	1
Deoxycorticosterone (DOC) receptor		1
Deoxyuridine triphosphatase; dUTPase		1
DHEA sulfotransferase	STD	1
Dihydrodiol dehydrogenase 1	DDH1	1
Dihydrolipoamide branched chain transacylase	DBT	5
Dihydrolipoamide dehydrogenase	DLD	5
Dihydrolipoyl dehydrogenase 2	PDHA	1
Dihydrolipoyl transacetylase	PDHA	1
Dihydroorotase		1
Dihydropyrimidinase	DPYS	1
Dihydroxyacetonephosphate acyltransferase	DHAPAT	1
Dihydropyrimidine dehydrogenase	DPYD	1

DNA glycosylases		1
DNA helicases		1
DNA Ligase 1	LIG1	1
DNA methyltransferase	DNMT	1
DOPA decarboxylase	DDC	1
Dopamine beta hydroxylase	DBH	1
Dopamine receptors D1	DRD1	5
Dopamine receptors D2	DRD2	5
Dopamine receptors D3	DRD3	5
Dopamine receptors D4	DRD4	5
Dopamine receptors D5	DRD5	5
Dynamin	DNM1	6
Electron-transferring-flavoprotein alpha	ETFA	2
Electron-transferring-flavoprotein beta	ETFB	2
Electron-transferring flavoprotein dehydrogenase	ETFDH	1
Endometrial bleeding-associated factor	EBAF	6
Endothelin converting enzyme	ECEI	5
Endothelin receptor type A	EDNRA	5
Endothelin receptor type B	EDNRB	5
Enolase	ENO1	1
Enoyl CoA reductase		1
Enterokinase	PRSS7,ENTK	1
Ephrin receptor tyrosine kinase A	EPHA	6
Ephrin receptor tyrosine kinase B	EPHB	6
Epidermal growth factor	EGF	6
Epidermal growth factor receptor	EGFR	6
Erythropoietin	EPO	4
Estrogen receptor	ESR	6
Excision repair complementation,group 1 protein	ERCC1	1
Factor 1 (No. one)	F1	4
FADH dehydrogenase		1
Fatty acid binding proteins FABP2	FABP2	2
Fc fragment of IgG, high affinity IA, receptor for	FCGRIA	6
Fc fragment of IgG, low affinity IIa, receptor for (CD32)	FCGR2A	6
Fc fragment of IgG, low affinity IIIa, receptor for (CDI 6)	FCGR3A	6
Ferritin, H subunit		2
Ferritin, L subunit	FTL	2
Fibrinogen alpha	FGA	3
Fibrinogen beta	FGB	3
Fibrinogen gamma	FGG	3
Fibroblast growth factor	FGFI	6
Fibroblast growth factor receptor 1	FGFR1	6



Fibroblast growth factor receptor 2	FGFR2	6
Fibroblast growth factor receptor 3	FGFR3	6
Flavin-containing monooxygenase 1	FMOL	1
Flavin-containing monooxygenase 2	FMO2	1
Flavin-containing monooxygenase 3	FMO3	1
Flavin-containing monooxygenase 4	FMO4	1
Follicle stimulating hormone receptor	FSHR,ODG1	6
Follicle stimulating hormone, FSH	FSHB	6
Follistatin		6
Frataxin	FRDA	6
Fructose-1,6-diphosphatase	FBP1	1
Fumarase	FH	1
Fumarylacetoacetase	FAH	1
GABA receptor, alpha 1	GABRA1	5
GABA receptor, alpha 2	GABRA2	5
GABA receptor, alpha 3	GABRA3	5
GABA receptor, alpha 4	GABRA4	5
GABA receptor, alpha 5	GABRA5	5
GABA receptor, alpha 6	GABRA6	5
GABA receptor, beta 1	GABRB1	5
GABA receptor, beta 2	GABRB2	5
GABA receptor, beta 3	GABRB3	5
GABA receptor, gamma 1	GABRG1	5
GABA receptor, gamma 2	GABRG2	5
GABA receptor, gamma 3	GABRG3	5
GABA transaminase	ABAT	1
Galactocerebrosidase	GALC	1
Galactokinase	GALK1	1
Galactose 1-phosphate uridyl-transferase	GALT	1
Galanin	GAL	5
Galanin receptor	GALNRI	5
Gamma-glutamyl carboxylase	GGCX	2
Gamma-glutamyltransferase 1	GGT1	2
Gamma-glutamyltransferase 2	GGT2	2
Gap junction protein beta 1	GJB1	2
Gap junction protein beta 3	GJB3	2
Gastric inhibitory polypeptide GIP	GIP	2
Gastric inhibitory polypeptide receptor, GIPR	GIPR	2
Gastric Intrinsic factor, GIF	GIF	1
Gastric lipase, LIPF		2
Gastrin	GAS	6
Gastrin releasing peptide	GRP	2
Gastrin releasing peptide receptor	GRPR	2
Glucagon receptor	GCGR	6
Glucagon synthase		2
Glucagon-like peptide receptor 1	GLP1 R	6
Glucocorticoid receptor	GRL	6

Glucokinase	GCK	1
Glucosaminyl (N-acetyl) transferase 2, I-branching enzyme	GCNT2	1
Glucose-6-phosphatase	G6PC	1
Glucose-6-phosphatase translocase	G6PT1	1
Glucose-6-phosphate dehydrogenase	G6PD	1
Glucosidase, acid beta	GBA	1
Glutamate decarboxylase, GAD	GAD1	1
Glutamate dehydrogenase	GLUD1	1
Glutamine phosphoribosylpyrophosphate amidotransferase/PRPP amidotransferase		1
Glutamine synthase		1
Glutathione	GSH	2
Glutathione peroxidase, GPX2	GPX2	1
Glutathione reductase, GSR	GSR	1
Glutathione S-transferase, GSTZ1	GSTZ1	1
Glutathione synthetase	GSS	1
Glyceraldehyde-3-phosphate dehydrogenase, GAPDH		1
GAPDH		
Glycerol kinase	GK	1
Glycerophosphate dehydrogenase 2	GPD2	1
Glycinamide ribonucleotide (GAR) transformylase	GART	1
Glycine dehydrogenase	GLDC	1
Glycogen branching enzyme	GBE1	1
Glycogen phosphorylase	PYGL	1
Glycogen synthase 1 (muscle)	GLYS1	1
Glycogen synthase 2 (liver)	GYS2	1
Glycosyltransferases, ABO blood group	ABO	1
Gonadotropin releasing hormone	GNRH	6
Gonadotropin releasing hormone receptor	GNRHR	6
Growth arrest-specific homeobox	GAX	6
Growth hormone 1	GH1	6
Growth hormone 2 (placental)	GH2	6
Growth hormone receptor	GHR	6
Growth hormone releasing hormone (GHRH)	GHRH	6
Growth hormone releasing hormone receptor	GHRHR	6
GTP cyclohydrolase I	GCHI	6
GTPase-activating protein, GAP	RASAI	6
Guanidinoacetate N-methyltransferase	GAMT	1
Guanine nucleotide-binding protein, alpha activating activity polypeptide, GNAO	GNA01	5
Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 1, GNA11	GNA11	5
Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 2, GNA12	GNA12	5

Guanine nucleotide-binding protein, alpha inhibiting activity polypeptide 3, GNA13	GNA13	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS1	GNAS1	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS2	GNAS2	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS3	GNAS3	5
Guanine nucleotide-binding protein, alpha stimulating activity polypeptide, GNAS4	GNAS4	5
Guanine nucleotide-binding protein, alpha transducing activity polypeptide, GNAT1	GNAT1	5
Guanine nucleotide-binding protein, alpha transducing activity polypeptide, GNAT2	GNAT2	5
Guanine nucleotide-binding protein, beta polypeptide 3	GNB3	5
Guanine nucleotide-binding protein, gamma polypeptide 5	GNG5	5
Guanine nucleotide-binding protein, q polypeptide	GNAQ	5
Guanylate cyclase 2D, membrane (retina-specific)	GUCY2D	1
Guanylate cyclase activator 1A (retina)	GUCA1A	1
Guanylate kinase		1
Guanylin	GUCA2	2
Guanylyl cyclase		1
Heat shock protein, HSP60		4
Heat shock protein, HSP70		4
Heat shock protein, HSP90		4
Heat shock protein, HSPA1		4
Heat shock protein, HSPA2		4
Hemopexin	HPX	4
Heparin binding epidermal growth factor	HBEGF	6
Hepatic lipase	LIPC	1
Hepatic nuclear factor-3-beta	HNF3B	1
Hepatic nuclear factor-4-alpha	HNF4A	1
Hexokinase 1	HK1	1
Hexokinase 2	HK2	1
Hexosaminidase A	HEXA,TSD	1
Hexosaminidase B	HEXB	1
Histamine receptors, H1		5
Histamine receptors, H2		5
Histamine receptors, H3		5
HMG-CoA lyase	HMGCL	1
HMG-CoA reductase	HMGCR	1
HMG-CoA synthase	HMGCS2	1
Holocarboxylase synthetase	HLCS	1

Holoprosencephaly 1	HPE1	6
Holoprosencephaly 2	HPE2	6
Holoprosencephaly 3	HPE3	6
Holoprosencephaly 4	HPE4	6
Homeobox (HOX) gene A13	HOXA13	6
Hormone-sensitive lipase	HSL	1
HSSB, replication protein		1
Human chorionic gonadotrophin, hCG	CG	6
Human placental lactogen	CSH1	6
Hydroxyacyl glutathione hydrolase	HAGH	1
Hypoxanthine-guanine phosphoribosyltransferase, HGPRT	HPRT	1
Hypoxia inducible factor 1	HIF1A	1
Hypoxia inducible factor 2		1
Iduronate 2 sulphatase	IDS	1
Immunoglobulin E (IgE) reponsiveness gene	IGER	4
Immunoglobulin E (IgE) serum concentration regulator gene	IGES	4
Immunoglobulin gamma (IgG) 2	IGHG2	
Indian hedgehog, ihh	IHH	6
Inhibin, alpha	INHA	6
Inhibin, beta A	INHBA	6
Inhibin, beta B	INHBB	6
Inhibin, beta C	INHBC	6
Inosine monophosphate dehydrogenase, IMPDH		1
Inosine triphosphatase	ITPA	1
Inositol 1,4,5-triphosphate receptor I	ITPR1	6
Inositol monophosphatase	IMPA1	5
Inositol polyphosphate 1-phosphatase	INPP1	5
Insulin	INS	6
Insulin receptor	INSR	6
Insulin receptor substrate-1	IRS1	6
Insulin-like growth factor 1	IGF1	6
Insulin-like growth factor 1 receptor	IGF1R	6
Insulin-like growth factor 2	IGF2	6
Insulin-like growth factor 2 receptor	IGF2R	6
Integrin beta 1	TGB1	6
Integrin beta 2	ITGB2	6
Interleukin(IL) 1 receptor	IL1R	
Interleukin(IL) 1, alpha	IL1A	
Interleukin(IL) 1, beta	IL1B	
Interleukin(IL) 10	IL10	
Interleukin(IL) 10 receptor	IL10R	
Interleukin(IL) 11	IL11	
Interleukin(IL) 11 receptor	IL11R	
Interleukin(IL) 12	IL12	

Interleukin(IL) 12 receptor, beta 1	IL12RB1	
Interleukin(IL) 13	IL13	
Interleukin(IL) 13 receptor	IL13R	
Interleukin(IL) 2	IL2	
Interleukin(IL) 2 receptor, alpha	IL2RA	
Interleukin(IL) 2 receptor, gamma	IL2RG	
Interleukin(IL) 3	IL3	
Interleukin(IL) 3 receptor	IL3R	
Interleukin(IL) 4	IL4	
Interleukin(IL) 4 receptor	IL4R	
Interleukin(IL) 5	IL5	
Interleukin(IL) 5 receptor	IL5R	
Interleukin(IL) 6	IL6	
Interleukin(IL) 6 receptor	IL6R	
Interleukin(IL) 7	IL7	
Interleukin(IL) 7 receptor	IL7R	
Interleukin(IL) 8	IL8	
Interleukin(IL) 8 receptor	IL8R	
Interleukin(IL) 9	IL9	
Interleukin(IL) 9 receptor	IL9R	
Interleukin(IL) receptor antagonist 1	IL1RN, IL1RA	4
Iodothyronine-5'-deiodinase, type 1 and 2		1
IP3 kinase		1
Islet amyloid polypeptide	IAPP	5
Isocitrate dehydrogenase		1
Isovaleric acid CoA dehydrogenase	IVD	1
Janus kinase 1	JAK1	6
Janus kinase 2	JAK2	6
Janus kinase 3	JAK3	6
Kallman syndrome gene	KAL1	6
Ketohexokinase	KHK	1
Ketolase		1
Lactase		1
Lactotransferrin	LTF	2
Laminin 5, alpha 3	LAMA3	6
Laminin 5, beta 3	LAMB3	6
Laminin receptor 1	LAMR1	6
Lecithin-cholesterol acyltransferase	LCAT	1
Leptin	LEP	6
Leptin receptor	LEPR	6
Leukotriene C4 synthase	LTC4S	1
LH/choriogonadotropin (CG) receptor	LHCGR	6
Lipoamide dehydrogenase	OGDH	1
Lipoprotein lipase	LPL	4
Lipoprotein, High Density	HDLDT1	2
Lipoprotein, Intermediate Density		2
Lipoprotein, Low Density 1		2

Lipoprotein, Low Density 2		2
Lipoprotein, Very Low Density	VLDLR	2
Lipoprotein-associated coagulation factor	LACI	4
Lipoxygenase		1
Lipoxygenase 12 (platelets)	LOG12	
Lipoxygenase 5 (leukocytes)		
Luteinizing hormone, beta chain	LHB	6
Lymphocyte-specific protein tyrosine kinase	LCK	4
Lysosomal acid lipase	LIPA	1
MAD (mothers against decapentaplegic, Drosophila) homologue 2	MADH2	6
Malate dehydrogenase, mitochondrial	MDH2	1
Malonyl CoA decarboxylase		1
Malonyl CoA transferase		1
Maltase-glucoamylase		1
Mannosidase, alpha B lysosomal	MANB	1
Mannosyl (alpha-1,6-)-glycoprotein beta-1, 2-N-acetylglucosaminyltransferase	MGAT2	2
Marenostrin	MEFV	2
Matrix Gla protein	MGP	6
MEK kinase, MEKK		1
Melanocortin 2 receptor	MC2R	2
Melanocortin 4 receptor	MC4R	2
Menin	MEN1	6
Methionine adenosyltransferase	MAT1A, MAT2A	1
Methionine synthase	MTR	1
Methionine synthase reductase	MTRR	1
Methylguanine-DNA methyltransferase	MGMT	1
Methylmalonyl-CoA mutase	MUT	1
Mitochondrial trifunctional protein, alpha subunit	HADHA	1
Mitochondrial trifunctional protein, beta subunit	HADHB	1
Molybdenum cofactor synthesis 1	MOCS1	1
Molybdenum cofactor synthesis 2	MOCS2	1
Monoamine oxidase A	MAOA	1
Monoamine oxidase B	MAOB	1
Multidrug resistance associated protein	MRP	6
Muscarinic receptor, M1	CHRM1	5
Muscarinic receptor, M2	CHRM2	5
Muscarinic receptor, M3	CHRM3	5
Muscarinic receptor, M4	CHRM4	5
Muscarinic receptor, M5	CHRM5	5
Muscle phosphorylase	PYGM	1
Na <sup>+</sup> , K <sup>+</sup> ATPase, alpha	ATP1A1	6
Na <sup>+</sup> , K <sup>+</sup> ATPase, beta 1	ATP1B1	6
Na <sup>+</sup> , K <sup>+</sup> ATPase, beta 2	ATP1B2	6

Na <sup>+</sup> , K <sup>+</sup> ATPase, beta 3	ATP1B3	6
Na <sup>+</sup> /H <sup>+</sup> exchanger 1	NHE1	2
Na <sup>+</sup> /H <sup>+</sup> exchanger 2	NHE2	2
Na <sup>+</sup> /H <sup>+</sup> exchanger 3	NHE3	2
Na <sup>+</sup> /H <sup>+</sup> exchanger 4	NHE4	2
Na <sup>+</sup> /H <sup>+</sup> exchanger 5	NHE5	2
N-acetyltransferase 1	NAT1	1
N-acetyltransferase 2	NAT2	1
NADH dehydrogenase (ubiquinone) Fe-S protein 1	NDUFS1	1
NADH dehydrogenase (ubiquinone) Fe-S protein 4	NDUFS4	1
NADH dehydrogenase (ubiquinone) avoprotein 1	NDUFV1	1
NADH-cytochrome b5 reductase reductase	DIA1	1
NADPH-dependent cytochrome P450 reductase	POR	1
Nephronophthisis 1	NPHP1	2
Nephrosis 1	NPHS1	2
Nerve growth factor	NGF	6
Nerve growth factor receptor	NGFR	6
Neuraminidase sialidase	NEU	2
Neuregulin	HGL	6
Neuroendocrine convertase 1	NEC1, PCSK1	1
Neurofibromin 1	NF1	6
Neurofibromin 2	NF2	6
Neuropeptide Y	NPY	5
Neuropeptide Y receptor Y1	NPY1R	5
Neuropeptide Y receptor Y2	NPY2R	5
Neurotensin	NTS	5
Neurotensin receptor	NTSR1	5
Neurotrophin 3	NTF3 or NT3	6
Neutral endopeptidase		1
Niemann-Pick disease protein	NPC1	2
Nitric oxide synthase 1, NOS1	NOS1	1
Nitric oxide synthase 2, NOS2	NOS2	1
Nitric oxide synthase 3, NOS3	NOS3	1
Notch ligand -jagged	JAG1, AGS	6
Nucleoside diphosphate kinase-A	NDPKA	1
Oncogene ret	RET	6
Oncogene sis	PDGFB	6
Orexin	OX	6
Orexin 1 receptor	OX1R	6
Orexin 2 receptor	OX2R	6
Omithine delta-aminotransferase	OAT	1
Ornithine transcarbamoylase	OTC, NME1	1
Oxytocin	OXT	5

Oxytocin receptor	OXTR	5
Paired box homeotic gene 6	PAX6	6
Paired box homeotic gene 8	PAX8	6
Palmitoyl-protein thioesterase	PPT	2
Pancreatic lipase	PNLIP	1
Paraoxonase PON1	PON1	1
Paraoxonase PON2	PON2	1
Paraoxonase PON3		1
Parathyroid hormone	PTH	6
Parathyroid hormone receptor	PTHRI	6
Parathyroid hormone related-peptide	PTHRP	6
Parathyroid hormone-like hormone	PTHLH	6
Peanut-like 1	PNUTL1	4
Peptidylglycine alpha-amidating monooxygenase	PAM	1
Peroxidase, salivary	SAPX	1
Peroxisomal membrane protein 3	PXMP3	2
Peroxisome biogenesis factor 1	PEX1	2
Peroxisome biogenesis factor 19	PEX19	2
Peroxisome biogenesis factor 6	PEX6	2
Peroxisome biogenesis factor 7	PEX7	2
Peroxisome proliferative activated receptor, alpha	PPARA	2
Peroxisome proliferative activated receptor, gamma	PPARG	2
P-glycoprotein I	PGY1	2
P-glycoprotein 3	PGY3	2
Phenylalanine hydroxylase	PAH	1
Phenylalanine monooxygenase		1
Phenylethanolamine N-methyltransferase, PNMT	PNMT	1
Phosphodiesterase 1 / nucleotide pyrophosphatase 1	PDNP1	6
Phosphodiesterase 1 / nucleotide pyrophosphatase 2	PDNP2	6
Phosphodiesterase 1 / nucleotide pyrophosphatase 3	PDNP3	6
Phosphoenolpyruvate carboxykinase	PCK1	1
Phosphofructokinase, liver	PFKL	1
Phosphofructokinase, muscle	PFKM	1
Phosphoglucomutase		1
Phosphoglucose isomerase	GPI	1
Phosphoglycerate kinase 1	PGK1	1
Phosphoglycerate mutase 2	PGAM2	1
Phospholipase A2, group 10	PLA2G10	4
Phospholipase A2, group 1B	PLA2G1B	4
Phospholipase A2, group 2A	PLA2G2A	4



Phospholipase A2, group 2B	PLA2G2B	4
Phospholipase A2, group 4A	PLA2G4A	4
Phospholipase A2, group 4C	PLA2G4C	4
Phospholipase A2, group 5	PLA2G5	4
Phospholipase A2, group 6	PLA2G6	4
Phospholipase C alpha		4
Phospholipase C beta		4
Phospholipase C delta	PLCD1	4
Phospholipase C epsilon		4
Phospholipase C gamma	PLCG1	4
Phosphomannomutase 2	PMM2	6
Phosphomannomutase 2	PMM2	2
Phosphomannose isomerase-1, PMI	MPI	2
Phosphoribosyl pyrophosphate synthetase	PRPS1	1
Phosphorylase kinase deficiency, liver	PHK	1
Phosphorylase kinase, alpha 1 (muscle)	PHKA1	1
Phosphorylase kinase, alpha 2	PHKA2	1
Phosphorylase kinase, beta	PHKB	1
Phosphorylase kinase, delta		1
Phosphorylase kinase, gamma 2	PHKG2	1
Phytanoyl-CoA hydroxylase	PHYH	6
Pineolytic beta-receptors		1
Pituitary adenylate cyclase activating peptide	PACAP	5
Pituitary adenylate cyclase activating peptide receptor	PACAPIR	5
Plasminogen activator receptor, Urokinase	UPAR;PLAUR	3
Plasminogen activator, Tissue	PLAT;TPA	1
Plasminogen activator, Urokinase	UPA;PLAU	1
Platelet derived growth factor	PDGF	6
Platelet derived growth factor receptor	PDGFR	6
Poly (ADP-ribose) synthetase	PARS	1
Polycystin 1	PKD1	2
Polycystin 2	PKD2	2
Porphobilinogen deaminase	HMBS	1
Potassium inwardly-rectifying channel J1	KCNJ1	5
Potassium inwardly-rectifying channel J11	KCNJ11	5
Potassium voltage-gated channel A1	KCNA1	5
Potassium voltage-gated channel E1	KCNE1	5
Potassium voltage-gated channel Q1	KCNQ1	5
Preproenkephalin	PENK	5
Preproglucagon	GCG;GLP1; GLP2	6
Preproglucagon		2
Preproinsulin		2
Profibrinolysin		6
receptor)		
Prolactin	PRL	6
Prolactin receptor	PRLR	6

Prolactin releasing hormone	PRH	6
Proliferin	PLF	6
Proline dehydrogenase	PRODH	1
Proline-rich protein BstNI subfamily 1	PRB1	3
Proline-rich protein BstNI subfamily 3	PRB3	3
Proline-rich protein BstNI subfamily 4	PRB4	3
Pro-melanin-concentrating hormone	PMCH	6
Proopiomelanocortin	POMC	5
Prophet of Pit1	PROP1	6
Prostacyclin synthase		4
Prostaglandin (PG) D synthase, hematopoietic	PGDS	1
Prostaglandin 15-OH dehydrogenase	HGPD;PGDH	4
Prostaglandin D - DP receptor		4
Prostaglandin E1 receptor		4
Prostaglandin E2 receptor		4
Prostaglandin E3 receptor		4
Prostaglandin F - FP receptor		4
Prostaglandin I2 receptor		2
Prostaglandin IP receptor		4
Prostaglandin isomerase		6
Prostasin, PRSS8	PRSS8	1
Protease nexin 2	PN2	1
Protein kinase B	PRKB	
Protein kinase C, alpha	PRKCA	1
Protein S	PROS	4
Protoporphyrinogen oxidase	PPOX	1
Pterin-4-alpha-carbinolamine	PCBD	
Pyrroline-5-carboxylate synthetase	PYCS	1
Pyruvate carboxylase	PC	1
Pyruvate decarboxylase	PDHA	1
Pyruvate kinase	PKLR	1
Quinoid dihydropteridine reductase	QDPR	1
Rathke pouch homeobox, RPX	RPX	6
Relaxin H1	RLN1	6
Relaxin H2	RLN2	6
Renin	REN	1
Replication factor C	RFC2	1
Retinal pigment epithelium specific protein (65kD)	RPE65	3
Retinaldehyde binding protein 1	RLBP1	2
Retinoic acid receptor, alpha	RARA	6
Retinoic acid receptor, beta	RARB	6
Retinoic acid receptor, gamma	RARG	6
Retinoid X receptor, alpha	RXRA	6
Retinoid X receptor, beta	RXRB	6
Retinoid X receptor, gamma	RXRG	6

Retinol binding protein 1		2
Retinol binding protein 2		2
Ribosephosphate pyrophosphokinase		1
RIGUI	RIGUI	6
Ryanodine receptor 1, skeletal	RYRI	6
S100 calcium-binding protein A3	S100A3	5
S100 calcium-binding protein A4	S100A4	5
S100 calcium-binding protein A7	S100A7	5
S100 calcium-binding protein A8	S100A8	5
S100 calcium-binding protein A9	S100A9	5
S100 calcium-binding protein B	S100B	5
S100 calcium-binding protein P	S100P	5
S-Adenosylmethionine decarboxylase, AMD		1
Salivary amylase, AMY1		2
Secretin	SCT	2
Secretin receptor, SCTR	SCTR	2
Serine hydroxymethyltransferase	SHMT	1
Serotonin N-acetyltransferase	SNAT	1
Serotonin receptor, 5HT1A	HTR1A	5
Serotonin receptor, 5HT1B	HTR1B	5
Serotonin receptor, 5HT1C	HTR1C	5
Serotonin receptor, 5HT1D	HTR1D	5
Serotonin receptor, 5HT1E	HTR1E	5
Serotonin receptor, 5HT1F	HTR1F	5
Serotonin receptor, 5HT2A	HTR2A	5
Serotonin receptor, 5HT2B	HTR2B	5
Serotonin receptor, 5HT2C	HTR2C	5
Serotonin receptor, 5HT3	HTR3	5
Serotonin receptor, 5HT4	HTR4	5
Serotonin receptor, 5HT5	HTR5	5
Serotonin receptor, 5HT6	HTR6	5
Serotonin receptor, 5HT7	HTR7	5
Serum amyloid A	SAA	2
Serum amyloid P	SAP	2
Sex determining region Y, SRY	SRY	6
Sex hormone binding globulin, SHBG		2
Sodium channel, non-voltage gated 1, alpha	SCNN1A	5
Sodium channel, non-voltage gated 1, beta	SCNN1B	5
Sodium channel, non-voltage gated 1, gamma	SCNN1G	5
Sodium channel, voltage-gated, type 1, beta polypeptide	SCN1B	5
Solute carrier family 1 (amino acid transporter), member 6	SLC1A6	2
Solute carrier family 1 (neutral amino acid transporter), member 4	SLC1A4	2

Solute carrier family 10 (sodium/bile acid cotransporter family), member 1	SLC10AL	2
Solute carrier family 10 (sodium/bile acid cotransporter family), member 2	SLC10A2	2
Solute carrier family 12, member 1	SLC12A1	2
Solute carrier family 12, member 2	SLC12A2	2
Solute carrier family 12, member 3	SLC12A3	2
Solute carrier family 14, member 2	SLC14A2	2
Solute carrier family 15 (H <sup>+</sup> /peptide transporter, intestinal), member 1	SLC15A1	2
Solute carrier family 15 (H <sup>+</sup> /peptide transporter, kidney), member 2	SLC15A2	2
Solute carrier family 16 (monocarboxylate transporter), member 1	SLC16A1	2
Solute carrier family 16 (monocarboxylate transporter), member 7	SLC16A7	2
Solute carrier family 17, member 1	SLC17A1	2
Solute carrier family 17, member 2	SLC 17A2	2
Solute carrier family 2 (facilitated glucose transporter), member 1	SLC2A1	2
Solute carrier family 2 (facilitated glucose transporter), member 2	SLC2A2	2
Solute carrier family 2 (facilitated glucose transporter), member 3	SLC2A3	2
Solute carrier family 2 (facilitated glucose transporter), member 4	SLC2A4	2
Solute carrier family 2 (facilitated glucose transporter), member 5	SLC2A5	2
Solute carrier family 20, member 3	SLC20A3	2
Solute carrier family 21, member 2	SLC21	2
Solute carrier family 21, member 3	SLC21A3	2
Solute carrier family 22, member 1	SLC22A1	2
Solute carrier family 22, member 2	SLC22A2	2
Solute carrier family 22, member 5	SLC22A5	2
Solute carrier family 3 (facilitated glucose transporter), member 1	SLC3A1	2
Solute carrier family 4 (anion exchanger), member 1	SLC4A1	2
Solute carrier family 4 (anion exchanger), member 2	SLC4A2	2
Solute carrier family 4 (anion exchanger), member 3	SLC4A3	2
Solute carrier family 5 (sodium/glucose transporter), member 1	SLC5A1	2
Solute carrier family 5 (sodium/glucose transporter), member 2	SLC5A2	2
Solute carrier family 5 (sodium/glucose transporter), member 5	SLC5A5	2

transporter), member 5		
Solute carrier family 5, member 3	SLC5A3	2
Solute carrier family 6 (GAMMA-AMINO BUTYRIC ACID transporter), member 1	SLC6A1	2
Solute carrier family 6 (neurotransmitter transporter, dopamine), member 3	SLC6A3	2
Solute carrier family 6 (neurotransmitter transporter, noradrenaline), member 2	SLC6A2	2
Solute carrier family 6 (neurotransmitter transporter, serotonin), member 4	SLC6A4	2
Solute carrier family 6, member 10	SLC6A10	2
Solute carrier family 6, member 6	SLC6A6	2
Solute carrier family 6, member 8	SLC6A8	2
Solute carrier family 7(amino acid transporter), member 1	SLC7A	2
Solute carrier family 7(amino acid transporter), member 2	SLC7A2	2
Solute carrier family 7(amino acid transporter), member 7	SLC7A7	2
Solute carrier family 8 (sodium/calcium exchanger), member 1	SLC8A1	2
Somatostatin	SST	5
Somatostatin receptor, SSTR1	SSTR1	5
Somatostatin receptor, SSTR2	SSTR2	6
Somatostatin receptor, SSTR3	SSTR3	5
Somatostatin receptor, SSTR4	SSTR4	5
Somatostatin receptor, SSTR5	SSTR5	5
Somatotrophin		6
Sorcin	SRI	2
SOS1 guanine nucleotide exchange factor	SOS1	6
Sperm prolamine P1	PRM1	6
Sperm prolamine P2	PRM2	6
Sphingomyelinase	SMPD1	1
SRY-box 10	SOX10	6
SRY-box 11	SOX11	6
SRY-box 3	SOX3	6
SRY-box 4	SOX4	6
SRY-box 9	SOX9	6
Steroid sulphatase	STS	1
Steroidogenic acute regulatory protein	STAR	2
Substance P		5
Succinyl CoA synthase		1
Sucrase		1
Sulfonylurea receptor	SUR	6
Superoxide dismutase 1	SOD1	1
Superoxide dismutase 3	SOD3	1
Surfeit	SURF1	6

T-BOX 1	TBX1	6
T-BOX 3	TBX3	6
Thiolase, peroxisomal		1
Thiopurine S-methyltransferase	TPMT	1
Thrombospondin	THBS1	6
Thromboxane A synthase 1	TBXAS1	4
Thromboxane A2	TXA2	4
Thromboxane A2 receptor	TBXA2R	4
Thymopoietin	TMPO	6
Thymosin		4
Thyroglobulin	TG	6
Thyroid hormone receptor, alpha	THRA	6
Thyroid hormone receptor, beta	THRB	6
Thyroid peroxidase	TPO	6
Thyroid receptor auxiliary protein	TRAP	6
Thyroid-stimulating hormone receptor	TSHR	6
Thyroid-stimulating hormone, alpha	TSHA	6
Thyroid-stimulating hormone, beta	TSHB	6
Thyrotropin releasing hormone	TRH	6
Thyrotropin releasing hormone receptor	TRHR	6
Thyroxin-binding globulin	TBG	2
Transacylase		1
Transcobalamin 2, TCN2	TCN2	2
Transcription factor 1, hepatic	TCF1	6
Transcription factor 2, hepatic	TCF2	6
Transcription termination factor, RNA polymerase 1	TTF1	6
Transferrin	TF	6
Transferrin receptor	TFRC	6
Transforming growth factor, beta 2	TGFB2	6
Transforming growth factor, beta induced	TGFBI	6
Transforming growth factor, beta receptor 2	TGFBR2	6
Transketolase	TKT	1
Transketolase-like 1	TKTL1	1
Transthyretin	TTR	2
Tubby-like protein 1	TULP1	6
Tuberous sclerosis 1	TSC1	6
Tuberous sclerosis 2	TSC2	6
Tyrosinase	TYR	1
Tyrosinase-related protein 1	TYRPI	1
Tyrosine aminotransferase	TAT	1
Tyrosine hydroxylase	TH	1
Ubiquitin activating enzyme, E1		1
Ubiquitin protein ligase E3A	UBE3A	1
UDP-glucose pyrophosphorylase		1
UDP-glucuronosyltransferase 1	ugt1d, UGT1	1
UDP-glucuronosyltransferase 2	UGT2	1

Uncoupling protein 1		2
Uncoupling protein 3	UCP3	2
Urate oxidase	UOX	1
Ureidopropionase		1
Uridine monophosphate kinase	UMPK	4
Uddine monophosphate synthetase	UMPS	4
Uridinediphosphate(UDP)-galactose-4-epimerase	GALE	1
Uroporphyrinogen decarboxylase	UROD	1
Uteroglobin	UGB	2
Vasoactive intestinal polypeptide	VIP	5
Vasoactive intestinal polypeptide receptor	VPR	5
Vasoinhibitory peptide		6
Von Hippel-Lindau gene	VHL	6
Werner syndrome helicase	WRN	6
Wolfram syndrome I gene	WFS1	3
Xylito dehydrogenase		1,

Legende für die Spalte Proteinfunktion:

1	Enzym	2	Transport und Lagerung
3	Struktur	4	Immunität
5	Nervale Transmission	6	Wachstum und Differenzierung

**Tabelle 15**  
**Kopfschmerzen**

<b>Liste der Gene</b>	<b>HUGO Gensymbol</b>	<b>Protein- funktion</b>
Acetylcholinesterase	ACHE	1
Adenyfate cyclase 1	ADCY1	1
Adenylate cyclase 2	ADCY2	1
Adenylate cyclase 3	ADCY3	1
Adenylate cyclase 4	ADCY4	1
Adenylate cyclase 5	ADCY5	1
Adenylate cyclase 6	ADCY6	1
Adenylate cyclase 7	ADCY7	1
Adenylate cyclase 8	ADCY8	1
Adenylate cyclase 9	ADCY9	1
Adrenergic receptor, alpha1	ADRA1	5
Adrenergic receptor, alpha2	ADRA2	5
Adrenergic receptor, beta1	ADRB1	5
Adrenergic receptor, beta2	ADRB2	5
Adrenergic receptor, beta3	ADRB3	5
Angiopoietin 1	ANGPT1	6
Angiopoietin 2	ANGPT2	6
Angiotensin converting enzyme	ACE, DCPL	1
Angiotensin receptor 1	AGTR1	2
Angiotensin receptor 2	AGTR2	2
Angiotensinogen	AGT	1
Arginase	ARG1	1
Arginine vasopressin	AVP	5
Atrial natriuretic peptide	ANP	6
Atrial natriuretic peptide receptor A	NPR1	6
Atrial natriuretic peptide receptor B	NPR2	6
Atrial natriuretic peptide receptor C	NPR3	6
Calcitonin/Calcitonin gene-related peptide alpha	CALCA	5
Calcium channel, voltage-dependent, alpha 1F subunit	CACNA1F	5
Calcium channel, voltage-dependent, Alpha-1B (CACNL1A5)	CACNA1B	5
Calcium channel, voltage-dependent, Alpha-1C	CACNA1C	5
Calcium channel, voltage-dependent, Alpha-1D	CACNA1D	5
Calcium channel, voltage-dependent, Alpha-1E (CACNL1A6)	CACNA1E	5
Calcium channel, voltage-dependent, Alpha-2/delta	CACNA2	5
Calcium channel, voltage-dependent, Beta 1	CACNB1	5
Calcium channel, voltage-dependent, Beta 3	CACNB3	5
Calcium channel, voltage-dependent, Neuronal, Gamma	CACNG2	5



Calcium channel, voltage-dependent, P/Q type, alpha 1A subunit	CACNA1A	5
Calcium channel, voltage-dependent, T-type		5
Calnexin	CANX	6
Cannabinoid receptor	CNR1	5
Carbonic anhydrase 3	CA3	1
Carbonic anhydrase 4	CA4	1
Carbonic anhydrase, alpha	CA1	1
Carbonic anhydrase, beta	CA2	1
Catechol-o-methyltransferase	COMT	1
Choline acetyltransferase	CHAT	1
Cyclic AMP-dependent protein kinase	PKA	1
Cyclic nucleotide phosphodiesterase 1B	PDE1B	1
Cyclic nucleotide phosphodiesterase 1B1	PDE1B1	1
Cyclic nucleotide phosphodiesterase 2A3	PDE2A3	1
Cyclic nucleotide phosphodiesterase 3A	PDE3A	1
Cyclic nucleotide phosphodiesterase 3B	PDE3B	1
Cyclic nucleotide phosphodiesterase 4A	PDE4A	1
Cyclic nucleotide phosphodiesterase 4C	PDE4C	1
Cyclic nucleotide phosphodiesterase 5A	PDE5A	1
Cyclic nucleotide phosphodiesterase 6A	PDE6A	1
Cyclic nucleotide phosphodiesterase 6B	PD 6B	1
Cyclic nucleotide phosphodiesterase 7	PDE7	1
Cyclic nucleotide phosphodiesterase 8	PDE8	1
Cyclic nucleotide phosphodiesterase 9A	PDE9A	1
Cyclooxygenase 1	COX1	1
Cyclooxygenase 2	COX2	1
CYP11A1	CYP11A1	1
CYP11B1	CYP11B1	1
CYP11B2	CYP11B2	1
CYP17	CYP17	1
CYP19	CYP19	1
CYP1A1	CYP1A1	1
CYP1A2	CYP1A2	1
CYP1B1	CYP1B1	1
CYP21	CYP21	1
CYP24	CYP24	1
CYP27	CYP27	1
CYP27B1	PDDR	1
CYP2A1	CYP2A1	1
CYP2A13	CYP2A13	1
CYP2A3	CYP2A3	1
CYP2A6V2	CYP2A6V2	1
CYP2A7	CYP2A7	1
CYP2B6	CYP2B6	1
CYP2C18	CYP2C18	1
CYP2C19	CYP2C19	1

CYP2C8	CYP2C8	1
CYP2C9	CYP2C9	1
CYP2D6	CYP2D6	1
CYP2E1	CYP2E1	1
CYP2F1	CYP2F1	1
CYP2J2	CYP2J2	1
CYP3A3	CYP3A3	1
CYP3A4	CYP3A4	1
CYP3A5	CYP3A5	1
CYP3A7	CYP3A7	1
CYP4A11	CYP4A11	1
CYP4B1	CYP4B1	1
CYP4F2	CYP4F2	1
CYP4F3	CYP4F3	1
CYP51	CYP51	1
CYP5A1	CYP5A1	1
CYP7A	CYP7A	1
CYP8	CYP8	1
Cystathionase	CTH	1
Cystathione beta synthase	CBS	1
Cytidine deaminase	CDA	1
Cytidine-5-prime-triphosphate synthetase	CTPS	1
Cytochrome a		1
Cytochrome c		1
Cytochrome c oxidase, MTCO		1
Cytokine-suppressive antiinflammatory drug-binding protein 1	CSBP1	4
Cytokine-suppressive antiinflammatory drug-binding protein 2	CSBP2	4
Dopamine beta hydroxylase	DBH	1
Dopamine receptors D1	DRD1	5
Dopamine receptors D2	DRD2	5
Dopamine receptors D3	DRD3	5
Dopamine receptors D4	DRD4	5
Dopamine receptors D5	DRD5	5
Dystonia 9	CSE	3
Endothelin 1	EDN1	5
Endothelin 2	EDN2	5
Endothelin 3	EDN3	5
Endothelin converting enzyme	ECEI	5
Endothelin receptor type A	EDNRA	5
Endothelin receptor type B	EDNRB	5
Enolase	ENO1	1
Epidermal growth factor	EGF	6
Epidermal growth factor receptor	EGFR	6
Erythropoietin receptor	EPOR	4
Glutathione	GSH	2

Glutathione S-transferase, GSTZ1	GSTZ1	1
Glyceraldehyde-3-phosphate dehydrogenase, GAPDH	GAPDH	1
Glycerol kinase	GK	1
Glycinamide ribonucleotide (GAR) transformylase	GART	1
Hexosaminidase B	HEXB	1
Histamine receptors, H1		5
Histamine receptors, H2		5
Histamine receptors, H3		5
Hypoxia inducible factor 1	HIF1A	1
Hypoxia inducible factor 2		1
Insulin	INS	6
Insulin receptor	INSR	6
Interleukin(IL) 1, alpha	IL1A	4
Interleukin(IL) 1, beta	IL1B	4
Interleukin(IL) receptor antagonist 1	IL1RN, IL1RA	4
IP3 kinase		1
Marenostrin	MEFV	2
Methylmalonyl-CoA mutase	MUT	1
Monoamine oxidase A	MAOA	1
Monoamine oxidase B	MAOB	1
Muscarinic receptor, M1	CHRM1	5
Muscarinic receptor, M2	CHRM2	5
Muscarinic receptor, M3	CHRM3	5
Muscarinic receptor, M4	CHRM4	5
Muscarinic receptor, M5	CHRM5	5
Myogenic factor 3	MYF3	6
Myogenic factor 4	MYF4	6
Myogenic factor 5	MYF5	6
NADH dehydrogenase reductase		1
Neurokinin A	NKNA	5
Neurokinin B	NKNB	5
Neuropeptide Y	NPY	5
Neuropeptide Y receptor Y1	NPY1R	5
Neuropeptide Y receptor Y2	NPY2R	5
Nitric oxide synthase 1, NOS1	NOS1	1
Nitric oxide synthase 2, NOS2	NOS2	1
Nitric oxide synthase 3, NOS3	NOS3	1
Phospholipase A2, group 10	PLA2G10	1
Phospholipase A2, group 1B	PLA2G1B	4
Phospholipase A2, group 2A	PLA2G2A	4
Phospholipase A2, group 2B	PLA2G2B	4
Phospholipase A2, group 4A	PLA2G4A	4
Phospholipase A2, group 4C	PLA2G4C	4
Phospholipase A2, group 5	PLA2G5	4
Phospholipase A2, group 6	PLA2G6	4
Phospholipase C alpha		4